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Aerotherm TR-76-13

AEROTHERM GRAPHITE SURFACE KINETICS COMPUTER PROGRAM (GASKET2)

USER'S MANUAL

Acurex Corporation/Aerotherm Division
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Air Force Rocket Propulsion Laboratory
Director of Science and Technology
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Edwards AFB, California 93523

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FOREWORD

This report was submitted by Acurex Corporation/ Aerotherm Division, 485 Clyde Avenue, Mountain View, CA 94042 under contract F04611-74-C-0023, Job Order No. 305909HU with the Air Force Rocket Propulsion Laboratory, Edwards AFB, California 93523.

Contract work was performed in the period 1 May 1974 to 31 July 1976 and was documented in this final report and in a second final report (AFRPL-TR-76-71) which is classified CONFIDENTIAL. In addition to the final reports and other written documentation, a 2-day seminar was conducted by Aerotherm at its Mountain View facility to present contract results to the rocket motor community in a timely fashion. The Aerotherm work was managed by Mr. Roger J. Bedard, Manager, Propulsion Systems, and the Air Force Technical Monitor was Mr. William F. Payne.

This report has been reviewed by the Information Office/DOZ and is releasable to the National Technical Information Service (NTIS). At NTIS it will be available to the general public, including foreign nations. This report is unclassified and suitable for general public release.

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The Aerotherm GASKET code was modified. The modified code, entitled GASKET2, includes a generalized computational scheme for combined equilibrium - nonequilibrium systems, sublimation kinetics, and an expanded thermochemistry data bank including the Duff-Bauer hydrocarbon species. GASKET2 predicts higher ablation rates than GASKET at surface temperatures above 5500°R. Both codes predict virtually equal ablation rates at surface

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temperatures below 5500°R. GASKET2 also accepts an increased number of surface kinetics - controlled reactions.

In addition to the modifications, surface kinetics for ATJ and G-90 bulk graphites, 15% silicon carbide modified pyrolytic graphite and Pyrocarb 901 and Carbitex 700 carbon/carbon materials were added to GASKET2. Also, improved surface kinetics for C plane pyrolytic graphite were included.

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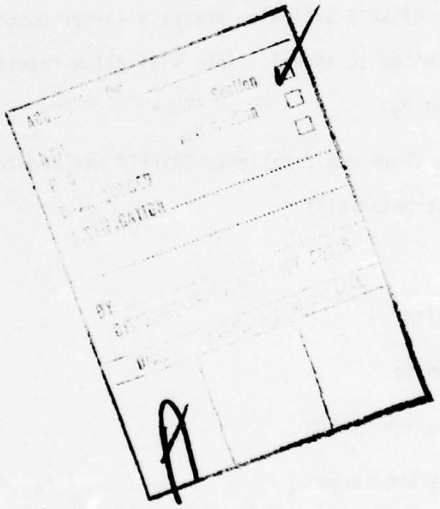

SUMMARY

Recent studies at Aerotherm have shown that the accuracy and versatility of the GASKET code can be improved by some minor code modifications. These modifications were identified and incorporated into the GASKET code. The modified code, entitled GASKET2, includes a generalized computational scheme for combined equilibrium-nonequilibrium systems, sublimation kinetics, and an expanded thermochemistry data bank including the Duff-Bauer hydrocarbon species. With these modifications, GASKET2 predicts higher ablation rates than GASKET at surface temperatures above 5500°R. These rates reach the asymptotic diffusion controlled value at the high temperature limit. At surface temperatures below 5500°R, however, both codes predict results with insignificant discrepancies. In addition to the improved predictions, GASKET2 will also accept a larger number of surface kinetically controlled reactions than GASKET (limited to three). This will allow reactants other than the three currently used; namely, H_2O, CO_2 and H_2.

In addition to the above modifications, GASKET2 was updated to include the surface kinetics of the following graphitic materials:

- 15% SiC/PG
- ATJ bulk graphite
- G-90 bulk graphite
- Pyrocarb 901 carbon/carbon
- Carbitex 700 carbon/carbon
- C plane pyrolytic graphite (improved kinetics)

Kinetic reaction rates for these materials were obtained from arc plasma generator and rocket motor data.

This report was prepared in two parts. The first part describes the code modifications and updates to GASKET. The differences between GASKET and GASKET2 are illustrated in terms of computational scheme and surface ablation rate predictions. Also, a brief description of the GASKET2 output

is included, so that users can use this code more effectively. The second part of the report contains an updated user's manual, a partial listing of GASKET2 which shows the locations where FORTRAN changes were made to GASKET, and three sample problems. Finally, it should be noted that this report serves only as an addendum to the earlier published GASKET reports.

SECTION 1

CODE MODIFICATIONS AND UPDATES

The Graphite Surface Kinetics (GASKET) computer code, developed under USAF Contract F04611-69-C-0081, was designed to calculate graphite surface thermochemical ablation rates as a result of exposure to propellant gases. The mathematical model, employed by GASKET, accounts for such thermophysical phenomena as:

- Diffusion of the reactive species from the boundary layer edge to the gaseous region adjacent to the carbon surface
- Adsorption of the reactive species to an active site on the carbon surface
- Formation of reaction products at the carbon surface
- Desorption of reaction products from the carbon surface
- Diffusion of reaction products into the boundary layer

Among all possible heterogeneous reactions occurring at the surface, only the following three were considered to be important at the temperature range and environments of interest:

$$C^* + H_2O \rightleftarrows H_2 + CO$$

$$C^* + CO_2 \rightleftarrows 2CO$$

$$2C^* + H_2 \rightleftarrows C_2H_2$$

Also under the same contract, the surface kinetics of the following materials were correlated:

- A-b plane pyrolytic graphite
- C plane pyrolytic graphite
- Bulk graphite

These correlations were then implemented into GASKET.

GASKET has been used extensively in rocket motor applications. The surface temperature range for this type of application is normally between 3000°R and 6000°R. For these applications, GASKET predicts satisfactory results.

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Recently, the trend of rocket nozzle design has been altered somewhat. Instead of burning the conventional propellant and fabricating rocket nozzles with pyrolytic graphite, higher enthalpy propellants and graphitic materials such as carbon/carbon composite and bulk graphite are used. The introduction of these new elements into the rocket technology necessitated the assessment of the prediction ability of GASKET in a temperature range exceeding 6000°R and the correlation of the ablation kinetics of these graphitic materials. Under USAF Contract F04611-74-C-0023, GASKET was modified to handle the high temperature calculations, and was updated to contain the surface kinetics of the graphitic materials that were correlated under the same contract.

1.1 GENERAL EQUILIBRIUM-NONEQUILIBRIUM COMPUTATIONAL SCHEME

As mentioned previously, the thermochemical ablation of graphite materials as a result of exposure to propellant gases is assumed to be controlled by the following heterogeneous reactions:

$$C^* + H_2O \rightleftarrows CO + H_2$$

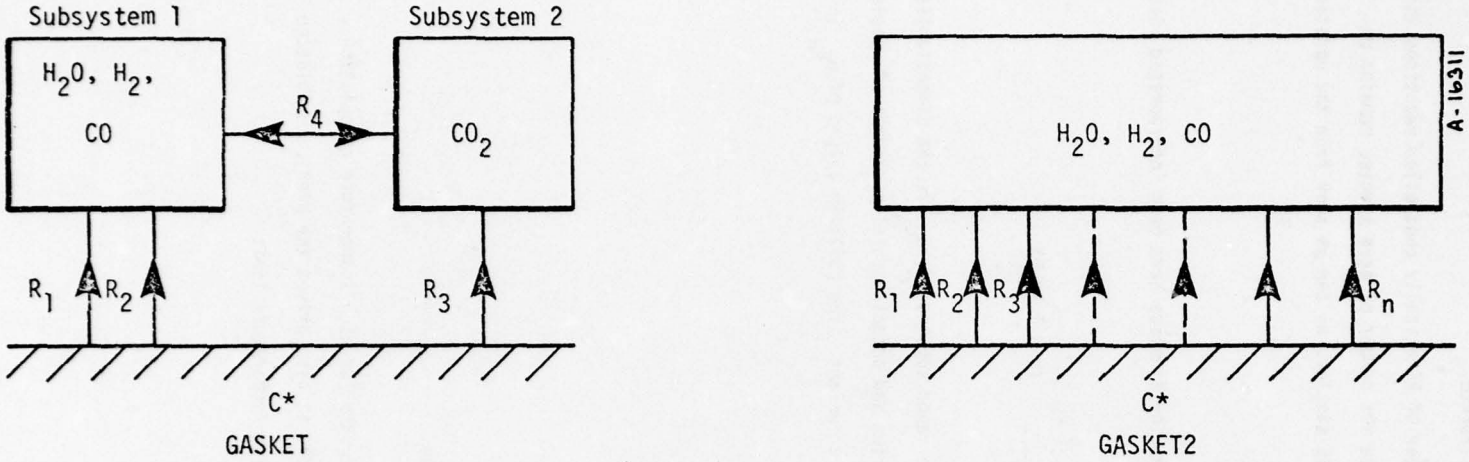
$$C^* + CO_2 \rightleftarrows 2CO$$

$$2C^* + H_2 \rightleftarrows C_2H_2$$

This kinetic model appears to be a viable assumption in the temperature range between 3000°R and 6000°R as satisfactory predictions have been obtained. However, as surface temperature exceeds 6000°R, other surface activities may become significant, e.g., sublimation. Due to the intrinsic weakness of the computational scheme used in GASKET, the inclusion of more than three surface reactions may encounter difficulties (see Reference 1 for detailed discussion). Since more surface reactions are required to be considered in high temperature predictions, it is necessary that such an intrinsic weakness be removed by using a more general computational scheme.

GASKET was modified to accommodate more surface reactions. This capability was made possible by allowing reactants and products to be base as well as nonbase species (see Reference 2). Through internal bookkeeping, the net generation rate for each base species is calculated without the complication of introducing a fictitious base species (as was done in the previous version of GASKET).

A comparison of the computational procedures for the two versions of GASKET is demonstrated schematically in Figure 1. A (H, O) composition edge-gas reaction with a carbon surface was taken as an illustrative example. As can be seen, a fictitious base species (in this case, CO_2) was created in order to accommodate the three kinetically controlled reactions in the previous version of GASKET.



$$C^* + H_2O \xrightarrow{R_1} CO + H_2$$

$$2C^* + H_2 \xrightarrow{R_2} C_2H_2 \rightleftharpoons 2CO + 3H_2 - 2H_2O$$

$$C^* + CO_2 \xrightarrow{R_3} 2CO$$

$$H_2O + CO \xrightarrow{R_4} CO_2 + H_2$$

Figure 1. Comparison of computational schemes between the previous and modified versions of GASKET.

If more kinetically controlled reactions are required more fictitious base species should be created accordingly. In addition, since gas phase species are in equilibrium, an artificial infinite rate reaction is required to allow subsystems 1 and 2 to equilibrate.

In contrast, GASKET2 is more versatile. The number of kinetically controlled reactions that can be input to the program is virtually unlimited, while the number of base species remains unchanged. Furthermore, the input procedure for GASKET2 is simpler, as can be seen from the updated input instructions.

1.2 SUBLIMATION KINETICS

The Knudsen-Langmuir (Reference 3) carbon vaporization kinetics have been incorporated into GASKET2. The expression is:

$$m_{C_n} = \alpha_{C_n} \frac{(P_{C_{n_{eq}}} - P_{C_n})}{\sqrt{2\pi RT/M_{C_n}}} \qquad (n = 1 \text{ to } 5)$$

where m_{C_n} is the mass flux in lbm/ft^2-sec for the carbon vapor species C_n, α_{C_n} is the dimensionless vaporization coefficient, $P_{C_{n_{eq}}}$ and P_{C_n} are the equilibrium and actual partial pressures of species C_n, T is the surface temperature, and M_{C_n} is the molecular weight. The built-in values of α_{C_n} in GASKET2 are as follows:

$$\alpha_{C_1} = .125$$

$$\alpha_{C_2} = .261$$

$$\alpha_{C_3} = .012$$

$$\alpha_{C_4} = .130$$

$$\alpha_{C_5} = .00096$$

The incorporation of sublimation kinetics is necessary for high temperature calculations. It not only predicts the ablation rate due to sublimation, it also drives the predicted ablation rates to the correct asymptotic ablation value at the high temperature limit.

1.3 THERMOCHEMICAL EQUILIBRIUM DATA

The determination of a thermodynamic state of a chemical reacting system requires the input of thermochemical equilibrium data describing the formation of each species. In a particular temperature and pressure range of interest, some species can be neglected without affecting the accuracy of the calculation significantly. However, it does not guarantee the same accuracy can be maintained when the range has been surpassed. Therefore, a screening study was initiated to evaluate the built-in thermochemical equilibrium data in GASKET for high temperature calculations.

The results of the evaluation show that the Duff-Bauer hydrocarbon species, formed favorably at temperatures above 6000°R but not below, should be included in the built-in data bank. With the inclusion of the Duff-Bauer hydrocarbon species, GASKET2 predicts higher ablation rates at or above 5500°R. The reason for the increase in the predicted ablation rate is due to a significant increase in the formation of C_3H at temperatures above 5500°R. Carbon molecules which ablate to the gas phase through surface reactions are quickly reacted to form C_3H. Therefore, a larger carbon sink exists in the gas phase with C_3H species than the one without. Furthermore, the existence of C_3H species can alter the reactive species concentration at the carbon surface, and hence the ablation rates.

1.4 COMPARISONS OF GASKET AND GASKET2 PREDICTIONS

A sample problem was run to compare the predictions from GASKET and GASKET2. The selected problem considers the thermochemical ablation at the exit cone location of the rocket nozzle when exposed to PEG/FEFO propellant. The surface material was assumed to be bulk graphite. The comparison of the two solutions in terms of B' versus T_w is shown in Figure 2. Also shown in this figure is the surface equilibrium solution which serves as the baseline solution. As can be seen, both GASKET and GASKET2 solutions predicted B' values below the surface equilibrium value at surface temperatures below 5500°R. This indicates that the surface reactions are kinetically controlled. Also, note that both solutions agree with each other with less than 10 percent discrepancy. As the surface temperature exceeds 5500°R, the B' predicted by GASKET2 gradually approaches the surface equilibrium value, whereas the GASKET B' is still markedly below and has no trend of approaching the surface equilibrium B'.

From the results of this comparison, the following conclusions can be drawn:

- Both GASKET and GASKET2 predict similar results at or below 5500°R
- At the upper temperature limit, GASKET2 has the correct asymptotic functional behavior

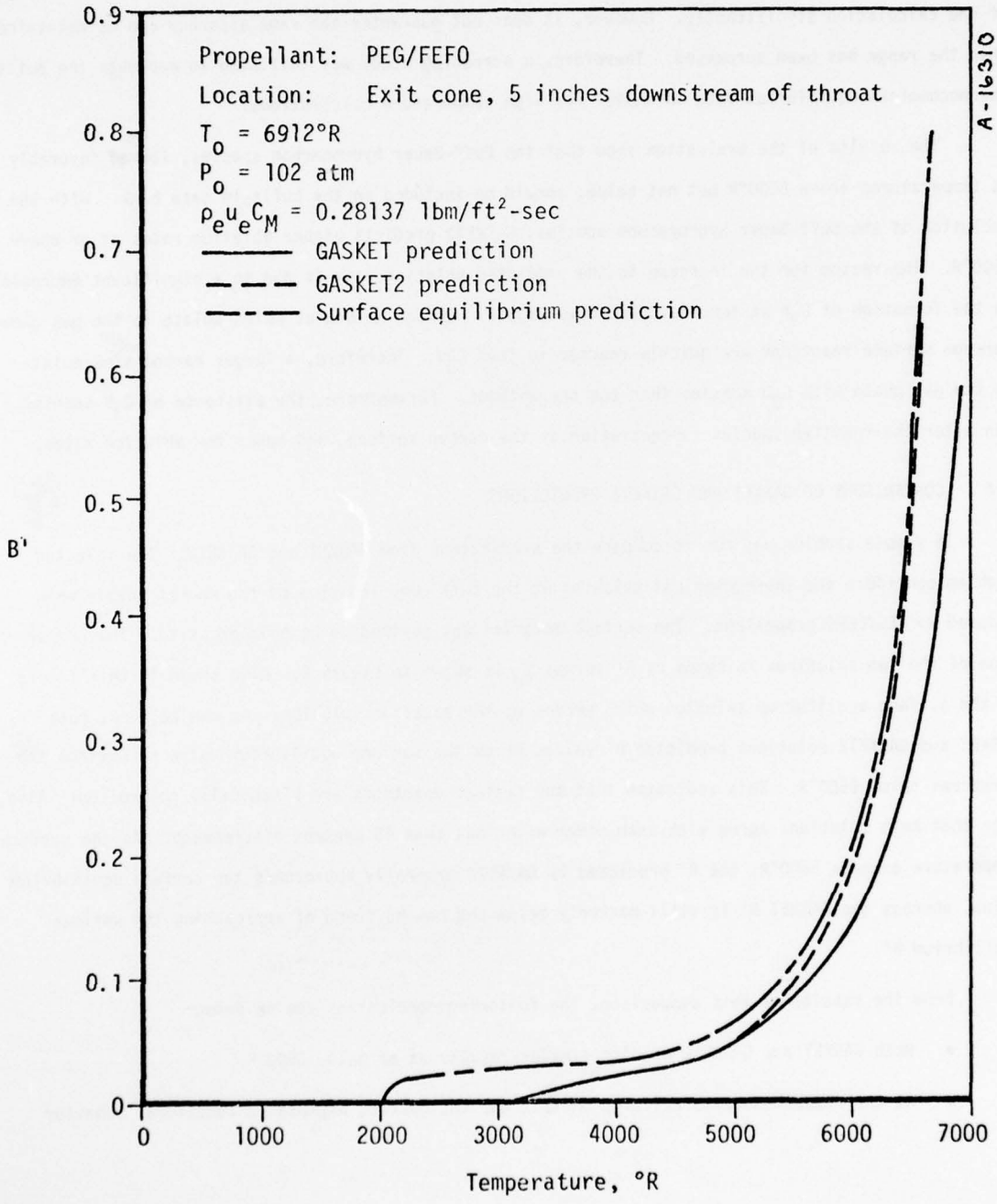


Figure 2. Comparison of GASKET and GASKET2 predictions.

1.5 DESCRIPTION OF GASKET2 OUTPUT ON TRANSPORT PROPERTIES AND SURFACE KINETICS INFORMATION

There are concerns by the users of whether GASKET2 computes transport properties based on both gas and condensed phase species, or on gas phase species alone. It is the purpose of this section to clarify that these properties are computed based on gas phase species only. The reason for neglecting condensed species is due to the common belief within the rocket community that condensed species have a small influence on boundary layer events.* For those users who also use ACE (Aerotherm Chemical Equilibrium code) to perform their inviscid flow field calculations, it should be noted that those transport properties are calculated including both gas and condensed phase species. Therefore, the user should evaluate the implications if those transport properties are being used.

For those users who are interested in obtaining information on how each individual heterogeneous reaction contributes to the total ablation rate, this information is also contained in the GASKET2 output. As an illustration, part of the GASKET2 output was extracted and presented in Figures 3 and 4. Figure 3 shows the printout of the built-in or input surface kinetic constants for each surface reaction. Note that the preexponential factor is normalized by the mass transfer coefficient ($\rho_e u_e C_M$). Shown at the bottom of Figure 4 for each surface reaction are the ablation rate and the ratio of the forward rate and the backward rate indicating how close the reaction is to being in equilibrium. By summing the net rates of all the surface reactions according to the following equation, the sum should be equal to B'.

$$B' = MW_{C^*} \sum_{i=1}^{N} \nu_{C^*i} \left[\text{Net Rate}\right]_i$$

N is the total number of surface reactions, and ν_{C^*i} is the stoichmetric coefficient of carbon for reaction i which can be obtained from the printout for surface kinetics information (see Figure 3).

*This is probably a valid assumption for regions near the nozzle throat; however, the nosecap and exit cone regions must be evaluated more carefully.

```
TRANSFER COEFFICIENT RHOF*UE*CM=    .94900+00

KINETIC
REACTION---       1

       1.00H2O +1.00C*  -->1.00CO  +1.00H2

     INHIBITION TERMS

       252.67H2O
      5418.31CO2
          .05CO
          .00H2

     POISONING TERMS

PRE-EXPONENT FACTOR    .726+06     ACTIVATION ENERGY    .102+06     T EXPONENT    .433+00      8      8      0
                 •
                 •
                 •
REACTION---       8

       5.00C*  -->1.00C5

PRE-EXPONENT FACTOR    .101-02     ACTIVATION ENERGY    .000        T EXPONENT   -.500+00     99      8      0
```

Figure 3. Typical GASKET2 output.

```
OPEN SYSTEM CHEMICAL KINETICS SOLUTION OUTPUT

 SURFACE IS PC 901
 MASS TRANSFER COEFFICIENT ROUCM =     .94900+00
 RHO V WALL/RHOE UE CM =     .13546+00   BPRIME =     .13546+00

 STATE ADJACENT TO THE SURFACE . . . .
  TEMP =  6119.9999 DEG R =  3400.0000 DEG K      PRESS =      31.47837 ATM

                                  GAS              CONDENSED        COMPOSITE
  ENTHALPY - BTU/LBM              .90329+03          .00000           .90329+03
  ENTROPY - BTU/LBM DEG R         .28345+01          .00000           .00000
  DENSITY - LBM/FT3               .15112+00                           .15112+00
  MOLECULAR WEIGHT                21.4580            .0000           21.4580

 NET FORWARD RATE OF KINETICALLY CONTROLLED REACTIONS
  (MOLES OF REACTION / UNIT SURFACE AREA / TIME / RHOE UE CM). . . .
  1=    .65142-03  2=    .13623-02  3=    .44967-02  4=    .37470-04  5=    .71843-04
  6=    .28152-04  7=    .13738-05  8=    .21875-07

RATIO OF FORWARD TO REVERSE KINETICALLY CONTROLLED PRODUCTION RATES
  1=    .14383+01  2=    .14383+01  3=    .20688+01  4=    .14383+01  5=    .20688+01
  6=    .29756+01  7=    .42798+01  8=    .61557+01
```

Figure 4. Typical GASKET2 output.

SECTION 2

INPUT INSTRUCTION MANUAL

2.1 GASKET2 INPUT

This section defines the format and significance of each field of the input data card deck for the modified Aerotherm Graphite Surface Kinetics (GASKET2) program. In the most general case, the input consists of eight card sets. These are:

1. CONTROL CARD
2. FROZEN-EDGE TEMPERATURE ARRAY
3. SURFACE TEMPERATURE ARRAY
4. ELEMENTAL COMPOSITION
5. DIFFUSION FACTOR DATA
6. SPECIES THERMOCHEMICAL EQUILIBRIUM DATA
7. OBLIQUE OR NORMAL SHOCK DATA
8. REACTION RATE DATA

Card Set 1 is a control card which contains a 10-element array, KRK(I). This array controls most of the program options and tells the program what to expect from the remaining card sets. Few problems require all card sets since, in most cases, the user will wish to utilize the data built into the GASKET program to replace card sets 2, 3, 5, 6, and 8. The card sets are described in detail in this section.

CARD SET 1 – CONTROL CARD (2 Cards)

CARD 1

FIELD 1 (Columns 1-10, Format 10I1) the variable array KRK(10) which is used to control the various program options.

COLUMN 1 -- EDGE THERMODYNAMIC STATE

0	Input
1	Static state behind shock, upstream conditions input (card set 7)
2	Same as 1, except stagnation state behind shock
3	Isentropic expansion from input chamber conditions
4	Static state behind shock, upstream conditions calculated via isentropic expansion from input chamber conditions (card set 7)
5	Same as 4, except stagnation state behind shock

COLUMN 2 -- STATE OPTION (*pertains to Z, cols. 11-20 of this card*)

0	Assigned temperature
2	Assigned enthalpy
3	Assigned entropy

COLUMN 3 -- SPECIES THERMOCHEMICAL DATA

0 9	Use built-in thermochemistry data
0	Use built-in diffusion factor data
12	Read from cards new thermochemistry data, and if provided, diffusion factor data
2	Print out thermochemistry data for allowable species
9	Update diffusion factor data

COLUMN 4 -- CARBON SURFACE SPECIFICATION

1	Layer-oriented PG
2	Edge-oriented PG
3	General Bulk Graphite
4	G-90 Bulk Graphite
5	ATJ Bulk Graphite
6	*Carbitex 700* Carbon/Carbon
7	PC-901 Carbon/Carbon
8	SiC/PG

COLUMN 5 -- FROZEN – EDGE TEMPERATURE ARRAY

0	Bypass this calculation
1	Use built-in temperature array
2	Read the temperature array from cards (card set 2)

COLUMN 6 -- SURFACE TEMPERATURE ARRAY

0	Bypass this calculation
1	Use built-in temperature array
2	Read the temperature array from cards (card set 3)

NOTE: When KRK(6) $\geq$ 1, GASKET2 automatically provides two equilibrium surface calculations, for 500°K and 1000°K, with the restriction of zero ablation; this is done in order to provide tables for CMA and/or ASTHMA which facilitate smooth interpolation.

COLUMN 7 -- KINETIC CONSTANTS

0	Use built-in Arrhenius/Langmuir model
1 3	Read from cards the pre-exponential factor, B'_m (lb mole reaction/ft^{2}sec), activation energy, E_m (cal/gm mole), and temperature exponent, Φ_m for both reaction and sublimation kinetics
23	Read from cards the partial pressure multiplicative factors, ψ_{jm} and F_{jm} (atm^{-1}) for reaction kinetics only

COLUMN 8 -- EDGE GAS ELEMENTAL COMPOSITION

1	e.g. does not contain H or O (Kinetically inert surface)
2	e.g. does not contain H (reaction 2. only)
3	e.g. does not contain O (reaction 3. only)
4	e.g. contains both H and O (reactions 1., 2., and 3.)

COLUMN 9 -- PUNCHED CARD OUTPUT

0	No punched card output
1 3	Punch a card appropriate to CMA input for each convergent frozen edge or surface solution
23	Punch a card appropriate to ASTHMA input for each convergent frozen edge or surface solution

COLUMN 10 -- DIAGNOSTIC OUTPUT CONTROL

0	No diagnostic output
1	Output a single line of diagnostic information per iteration
j	(Where j is a digit greater than one) output full diagnostic information for 5(j-1) iterations and output a single line of diagnostic information for subsequent iterations.

FIELD 2 (Columns 11-20, Format F10.5) Thermodynamic State Variable, Z

1) a) If KRK(2) = 0, Z is assigned to temperature, °K
   b) If KRK(2) = 2, Z is assigned to enthalpy, cal/gm
   c) If KRK(2) = 3, Z is assigned to entropy, cal/gm°K

2) a) If KRK(1) = 0, Z pertains to the edge state
   b) If KRK(1) = 1 or 2, Z pertains to the thermodynamic state upstream of a shock wave
   c) If KRK(1) $\geq$ 3, Z pertains to the chamber thermodynamic state
      i) If PC = 0, Z pertains to the actual chamber state
      ii) If PC $\neq$ 0, Z pertains to the ideal chamber state (see PC, Cols. 41-50 of this card)

FIELD 3 (Columns 21-30, Format F10.5) Pressure, PR atm

1) If KRK(1) = 0, PR pertains to the edge thermodynamic state
2) If KRK(1) $\neq$ 0, PR pertains to the actual chamber thermodynamic state or to the thermodynamic state upstream of a shock wave

FIELD 4 (Columns 31-40, Format F10.5) Edge or Shock Upstream Thermodynamic State, ZE

1) If KRK (1) $\leq$ 2, this field is ignored

2) a) If ZE > 0, it is assigned as the pressure, atm, at either the edge (KRK (1) = 3), or the upstream side of a shock wave (KRK(1) = 4 or 5)
   b) If ZE < 0, it is assigned as the Mach number at either the edge (KRK (1) = 3) or the upstream side of a shock wave (KRK(1) = 4 or 5)

FIELD 5 (Columns 41-50, Format F10.5) Ideal Chamber Pressure, PC atm

FIELD 6 (Columns 51-60, Format F10.5) Mass Transfer Coefficient, ROUCM lbm/ft^{2}sec

FIELD 7 (Columns 61-70, Format F10.5) Diffusion Coefficient Exponent for Unequal Diffusion Coefficient Model, GAMER

1) If GAMER = 0.0, it is automatically set to 2/3 (this value is appropriate for most calculations)

2) If GAMER = 10^{-5}, the diffusion model reduces to equal diffusion coefficients

FIELD 8 (Columns 71-80, Format 2A4,A4) Job Title, TILE (3)

CARD 2 If KRK(4) $\neq$ 8, skip this card

FIELD 1 (Columns 1-10, Format F10.0) Mass fraction of SiC in SiC/PG

CARD SET 2 — FROZEN-EDGE TEMPERATURE ARRAY TFA(I) (number of cards = no. of temperatures + 1)

1) If KRK(5) = 0 or 1, skip this card set

2) If KRK(5) = 2, read in an array of no more than eight temperatures, TFA(I) °K

CARD(S) 1,2,... (Columns 1-10, Format F10.5) one temperature per card

FINAL CARD blank

NOTE: The TFA(I) array built into GASKET2 contains temperatures from 500 to 4000°K in 500°K increments

CARD SET 3 — SURFACE TEMPERATURE ARRAY TSA(I) (number of cards = no. of temperatures + 1)

1) IF KRK(6) = 0 or 1, skip this card set

2) If KRK(6) = 2, read in an array of no more than fifteen temperatures, TSA(I) °K

CARD(S) 1,2.... (Columns 1-10, Format F10.5) one temperature per card

FINAL CARD blank

NOTE: The TSA(I) array built into GASKET2 contains temperatures from 1200 to 4000°K in 2000°K increments. Also, whenever KRK(6) $\geq$ 1 two surface equilibrium, zero-ablation calculations are performed for surface temperatures of 500 and 1000°K.

CARD SET 4 — ELEMENTAL COMPOSITION (number of cards = no. of elements +1)

CARD 1 (Columns 1-3, Format I3) the number of elements in the system

CARD 2,3,4 . . . *(one card for each element)*

FIELD 1 (Columns 1-3, Format I3) the atomic number of the element

FIELD 2 (Columns 4-15, Format 3A4) the name of the element (for output identification only)

FIELD 3 (Columns 16-25, Format F10.5) the atomic weight of the element

FIELD 4 (Columns 26-35, Format F10.5) the relative amount of the element in the edge gas (this is the same as the relative amount of the element in the chamber or at the upstream side of a shock wave, since elements are conserved)

1) Positive values are in relative gram-atomic-weights (or moles)

2) Negative values are in relative masses

FIELD 5 (Columns 46-55, Format F10.5) the relative amount of the element in the surface material (the present version of GASKET2 allows the surface to be comprised of carbon only; hence, the quantity 1.0 must be entered in this field for the element carbon)

CARD SET 5 — DIFFUSION FACTOR DATA (number of cards = 1/4 x (7 + no. of data items, e.g., diffusion factors, reference molecular weight, diffusion exponent)

1) If KRK(3) = 0, this card set must be skipped

2) If KRK(3) = 1,2,3, or 4, this card set may be skipped

3) If KRK(3) = 9, this card set must not be skipped

CARD 1 (Columns 1-3, Format I3) the total number of data items (e.g., diffusion factors, reference molecular weight, diffusion exponent) to be entered

Diffusion factors may be specified for any or all species individually and/or diffusion factors may be calculated via

$$\text{Diffusion Factor} = \left(\frac{\text{Molec.Wt.}}{\text{REFM}} \right)^{\text{FFA}}$$

where REFM and FFA may be specified here. For species for which diffusion factors are not specified individually, diffusion factors will be calculated via the above correlation, and if REFM and FFA are not specified, diffusion factors will be calculated from the above with REFM = 23.4 and FFA = 0.431.

CARD(S) 2,3,. . .

FIELDS 1,3,5,7 (Columns 1-8, 21-28, 41-48, 61-68, each Format 2A4)

The "name" of the species for which data is to be provided, exactly as it appears in columns 73-80 of the first card of the 3 thermochemical data cards (card set 6) for that species. To specify values of REFM or FFA in the next field, enter the alpha characters "REFM" or "FFA" respectively here.

FIELDS 2,4,6,8 (Columns 9-20, 29-40, 49-60, 69-80, each Format E12.4)

1) If the name of a chemical species was entered in the preceding field, this number is presumed to be a diffusion factor.

2) If the name REFM or FFA was entered in the preceding field, enter the desired values of REFM or FFA respectively in this field.

The diffusion factors introduced into the solution in this manner replace either the values set automatically (see card 1 above) if the species thermochemical data are read from cards or tape, or the values built into the GASKET2 program (see Volume II).

NOTE: If KRK(3) = 9 and KRK(1) = 1,2,4 or 5, this card set must follow the OBLIQUE OR NORMAL SHOCK DATA card set; if KRK(3) = 1,2,3, or 4 this card set, if used, precedes the SPECIES THERMOCHEMICAL EQUILIBRIUM DATA card set.

CARD SET 6 — SPECIES THERMOCHEMICAL EQUILIBRIUM DATA (number of cards = 1 + 3 x no. of species)

1) If KRK(3) = 0 or 9, skip this card set

2) If KRK(3) = 1,2,3, or 4, read in this card set; there are three of these cards for each molecular, atomic, or condensed species; the end of this card set is signaled by a blank card

CARDS 1,4,7 . . . Describe the elemental composition of the species and establish its name designation

FIELDS 1,3,5,. . ., 13 (one for each element in the species)
(Columns 1-3, 7-9, 13-15,. . ., 37-39, each format F3.0)

The number of atoms (of atomic number given in the following field) in a molecule of this species

(If field 1 is zero, this card is presumed to represent the end of card set 6)

FIELDS 2,4,6,. . ., 14. (one for each element in the species)
(Columns 4-6, 10-12, 16-18,. . ., 40-42, each format I3)

The atomic numbers of the elements in the molecule (the number of atoms of which was given in the previous field)

(If field 2 is zero, this card is presumed to be the first card of card set 5)

FIELD 15 (Columns 42-72, Format 7A4A2) the source and date of the thermochemical data for this specie. Used for output only

FIELD 16 (Columns 73-80, Format 2A4) the name designation of this species (e.g., AL203). This variable is used for output and as a means of identifying data entered in card set 5

CARDS 2,5,8. . . Lower temperature range thermochemical data

FIELDS 1,2,3,4,5 and 6 (Columns 1-54, Format 6E9.6) Input the 5 constants (F1,F2, F3,F4,F5,F6) appropriate to the lower temperature range of the thermodynamic data for this species. These constants are defined as follows, where T is in °K:

F1 = the heat of formation of the species at 298°K from the JANNAF base state (elements in most natural form at 298°K) in cal/mole

F2 = the enthalpy change of the species from 298°K to 3000°K in cal/mole

F3,F4 and F5 are defined by a curve fit to the heat capacity at constant pressure of the form:

$$C_p = F3 + F4\ T + \frac{F5}{T^2} \text{ in cal/mole °K}$$

F6 = the entropy of the species at 3000°K in cal/mole °K

FIELD 7 (Columns 61-66, Format F6.0) the upper limit of the lower temperature range in °K

FIELD 8 (Column 67, Format I1) the phase specification:

1 signifies gaseous species
2 signifies solid species
3 signifies liquid species

The only phase combination allowed in one three card set is solid-liquid in which case a 2 and 3 would appear in fields 8 of cards 2 and 3, respectively.

CARDS 3,6,9. . . Upper temperature range thermochemical data

These cards are the same as cards 2,5,8. . . except use constants for the upper temperature range and field 7 is ignored

LAST CARD OF CARD SET 6 MUST BE BLANK

The end of the species thermochemical data is signified by a blank card. Hence, the last card of card set 6 must be a blank card.

NOTE: If this data is read in on cards, the atomic number of C* must be 106, rather than than the actual value of 6. Finally, all condensed phase species (except C*) must follow the gas phase species.

CARD SET 7 — OBLIQUE OR NORMAL SHOCK DATA (1 card)

1) If KRK(1) = 0 or 3, skip this card set

2) If KRK(1) = 1,2,4, or 5, this card set must be read in

FIELD 1 (Column 1, Format I1) Input the variable KVH which determines how the velocity ahead of the shock, the static enthalpy ahead of the shock, and the total enthalpy are calculated (since total enthalpy = static enthalpy + 1/2 velocity^2)

If KVH = 1, velocity is calculated from specified total and static enthalpy

If KVH = 2, total enthalpy is calculated from specified static enthalpy and velocity

If KVH = 3, static enthalpy is calculated from specified total enthalpy and velocity

FIELD 2 (Columns 2-10, Format F9.4) The velocity variable, UR (this field is ignored if KVH = 1)

If UR $\neq$ -9999, then UR is assigned to SVL, the velocity upstream of the shock in ft/sec

If UR = -9999, the velocity calculated in the prior solution is assigned to SVL

FIELD 3 (Columns 11-20, Format F10.4) The total enthalpy variable, HTR (this field is ignored if KVH = 2)

If HTR $\neq$ 0, then HTR is assigned to HCH, the total enthalpy of the system in BTU/lbm

If HTR = 0, HCH is unchanged

FIELD 4 (Columns 21-30, Format F10.4) the static enthalpy variable, HSR (This field is ignored if KVH = 3)

If HSR $\neq$ -9999, then HSR is assigned to SH1, the static enthalpy upstream of the shock in BTU/lbm

If HSR = -9999., the static enthalpy calculated in the prior solution is assigned to SH1

FIELD 5 (Columns 41-50, Format F10.4) the shock angle (0.0 for a normal shock) in degrees

CARD SET 8 — REACTION RATE DATA (number of cards = 3 x MT -10 at maximum)

1) If KRK(7) = 0, skip this card set

2) If KRK(7) = 1 or 3, the first subset of this card set must be read in

3) If KRK(7) = 2 or 3, the second subset of this card set must be read in

First Subset: MT cards

CARDS 1,2, . . ., MT

FIELD 1 (Columns 1-10, Format E10.4), FKF(M) the preexponential factor for the Mth reaction, lb mole/ft^{2}sec atm

FIELD 2 (Columns 11-20, Format E10.4), EAK(M), the activation energy for the Mth forward reaction, cal/gm mole

FIELD 3 (Columns 21-30, Format E10.4), EXK(M), the temperature exponent for the Mth reaction

Second Subset: 2 x MT -10 cards

CARDS MT + 1, MT + 3, MT + 5;. . . 3 x MT -13, 3 x MT -11;

FIELDS 1-6 (Columns 1-10 x 6, Format 8F10.6, inhibiting specie partial pressure coefficient, PSI (J,M), J = 1, 6 atm^{-1}

CARDS MT + 2, MT + 4; MT + 6, 7, . . . 3 x MT - 12, 3 x MT -10

FIELDS 1-6 (Columns 1-10 x 6, Format 8F10.6, inhibiting specie partial pressure coefficient FKK(J,M), J = 1, 6, atm^{-1}

NOTE: MT = no. of reactions

1) IF KRK(8) = 1, MT = 0, kinetics ignored

2) If KRK(8) = 2, MT = 1 + 5 sublimation kinetics reactions

M = 1 $C^* + CO_2 \rightleftarrows 2CO$

J = 1 CO_2

J = 2 CO

3) If KRK(8) = 3, MT = 1 + 5 sublimation kinetics reactions

M = 1 $2C^* + H_2 \rightleftarrows C_2H_2$

J = 1 H_2

4) If KRK(8) = 4, MT = 3 + 5 sublimation kinetics reactions

M = 1 $C^* + H_2O \rightleftarrows CO + H_2$

M = 2 $C^* + CO_2 \rightleftarrows 2CO$

M = 3 $2C^* + H_2 \rightleftarrows C_2H_2$

J = 1 H_2O

J = 2 CO_2

J = 3 CO

J = 4 H_2

J = 5 CLH

J = 6 FH

TO TERMINATE A JOB

KRK(1) = 8 on final card

MULTIPLE JOBS

1) Several jobs may be loaded back to back, with a control card signifying the start of each new job:

CONTROL CARD #1
:
ELEMENTAL COMPOSITION #1
:
additional data as required for job #1
:

CONTROL CARD #2

:

ELEMENTAL COMPOSITION #2

:

additional data as required for job #2

:

KRK(1) = 8

2) If jobs following the first job have the same elemental composition as the first job, Card Set #4 (ELEMENTAL COMPOSITION) may be replaced by a single blank card for all jobs after the first:

CONTROL CARD #1

:

ELEMENTAL COMPOSITION #1

:

additional data as required for job #1

:

CONTROL CARD #2

:

blank card

:

additional data as required for job #2

:

KRK(1) = 8

2.2 NEW FORTRAN VARIABLE NAMES USED IN GASKET2

This section describes the names and definitions of the newly introduced FORTRAN variables resulting from the computer code modification. Since this is an addendum to Reference 1, similar format and abbreviations are adopted here.

LIST OF NEW FORTRAN VARIABLES APPEARING IN COMMON STATEMENTS, GASKET2

Variable Name	Description	Routine(s) in Which Variable is Utilized
CPER	Mass fraction of carbon in SiC/PG	KN,IM
FKKS(M)	Same definition as FFX(M)	T,KT
INP(M)	Chemical reaction index (8 = oxidation, 99 = sublimation)	T,KT
NMP(N,M)	Index used to locate the reactants in the thermochemical equilibrium data	T,KT
NMR(N,M)	Index used to locate the products in the thermochemical equilibrium data	T,KT
NPF(N,M)	Index used to locate the poisoning species in the thermochemical equilibrium data	T,KT
NPP(N,M)	Index used to locate the inhibiting species in the thermochemical equilibrium data	T,KT
PERCT	Mass fraction of SiC in SiC/PG	KN,IM
SIPER	Mass fraction of Si in SiC/PG	KN,IM

LIST OF NEW FORTRAN VARIABLES APPEARING IN SUBROUTINE KINET, GASKET2

Variable Name	Description
DBDP	Locally defined variable
VLNI	(-H/RT + S/R) of reactant
VLNII	(-H/RT + S/R) of product
VNNMR	Local variable for VNU(I,J) of reactants
VNNMP	Local variable for VNU(I,J) of products
VNNPP	Local variable for VNU(I,J) of inhibiting species
VNNPF	Local variable for VNU(I,J) of poisoning species
XX(M)	Saved value of preexponential constant

LIST OF NEW FORTRAN VARIABLES APPEARING IN SUBROUTINE THERM GASKET2

Variable Name	
FKKD(I,J,K)	Built-in values for poisoning species
FNAM(I,IZ)	Temporary variable for the chemical symbol of the species involved in the chemical reaction ($IZ \leq 4$ reactants, $5 \leq IZ \leq 8$ products, $9 \leq IZ \leq 16$ inhibiting species, $17 \leq IZ \leq 24$ poisoning species)
FSS(I)	Sublimation constants built-in value
IIZ	Index to define total number of species involved in the chemical reactions
INHB(I)	First four alphanumeric characters for the chemical symbol of the inhibiting species
IRX	Flag indicating type of surface reaction (1 = reactions involved H,O species, 2 = reaction involved O species only, 3 = reaction involved H species only)
MS	Total number of sublimation kinetic reactions
POIS(I,J)	First four alphanumeric characters for the chemical symbol of the poisoning species
PRSP(I,J)	First four alphanumeric characters for the chemical symbol of products
PSID(I,J,K)	Built-in values for inhibiting coefficients
RXSP(I,J)	First four alphanumeric characters for the chemical symbol of reactants
RUCM	Same as ROUCM
SUBC	Locally defined variable

2.3 LISTING OF THE MODIFIED SUBROUTINES

The listing of the following subroutines are given in this section:

- IMELM
- INPUT
- KINET
- OUTPUT
- THERM
- KININ
- ZIPIN
- AFMAT
- ALPST
- BELCH
- CRECT
- GASKET
- MAT 1
- MAT 2
- MAT 3
- PROPS
- SCALE

The modifications made to the subroutines are shown in the right hand side column. The notation "**-n" means that n lines of FORTRAN statements have been deleted preceeding the line where "**-n" appeared. "*COR" indicates the location where new FORTRAN statements are inserted.

```
      SUBROUTINE I4ELM                                                  IMEL0001
C                                                                       IMEL0002
      REAL NFIA(1),NFIB(1),FFIN(1),TAU(10,10)                           IMEL0003
      EQUIVALENCE (NFIA(1),A(1)), (NFIB(1),A(51)), (FFIN(1),A(101)),    IMEL0004
     1(TAU(1),A(151))                                                   IMEL0005
      DIMENSION TF(180),CIJ(180,1)                                      IMEL0006
      DIMENSION X(1),VLAM(180,1)                                        IMEL0007
C                                                                       IMEL0008
      COMMON           FAMDA(180),FAMDR(180),RR(180,2),RC(180,2),       IMEL0009
     1                 RD(180,2),RE(180,2),RF(180,2),TU(180,2),VM(180), IMEL0010
     2                 Y(180),WTM(180),VNU(180,10),FF(180),IFC(180),    IMEL0011
     3                 IP(180),CP(180),M(180),SP(180),TC(180),VLNK(180), IMEL0012
     4                 E(180),LAMT(180),GAMK(1,1)                       IMEL0013
C                                                                       IMEL0014
      COMMON /PARAM1/ KIN,KOUT,JAN,KOL,NAP,IDC,N,KKX(3),KR(10),TILE(3), IMEL0015
     1                TTMIN,TTMAX,VISC,PR(1)                           IMEL0016
C                                                                       IMEL0017
      COMMON /PARAM2/ KN,SCH,RHO,VEL,R1,NEE,FFA,IS,ISP,P,T,SIP,HIP,    IMEL0018
     1                EL,ENL,FLIQ,NO,TFL,TSPO,KRALP,CPE,IPE,IER,AA,TTS, IMEL0019
     2                IN,IL,IT,MODE,HMELT,SMELT,TMAX,TMIN,MELT,SUMM,   IMEL0020
     3                SUML,JC,HG,CPG,SVA,SVB,SVC,SVD,SUNC,NXC,SA1,     IMEL0021
     4                VMACH,KPZZ,SP1,GAM,TMT,MX,DMCHT,HCH,NCV,IRT,     IMEL0022
     5                IFPZ,NOAT,SR1,IXG,SV1,KKJ,IXC,MXG,SH1,NOATO,     IMEL0023
     6                SA2,FFF,WS,RV,CME,VA,HOS,DUM1,DUM2,EP,IFCJC,     IMEL0024
     7                ISP2,HTG,VMU2,WTL                                IMEL0025
C                                                                       IMEL0026
      COMMON /ARRAYS/ A(16,16),B(16),U(3),XC(50),XG(50),ZKE(10),       IMEL0027
     1                TLO(10),DMCLO(10),WALJP(10),EB(10),ALP(10),      IMEL0028
     2                GAMH(10),GAME(10),TG(10,3),TK(10,3),WAT(10),     IMEL0029
     3                IP(10),ICAT(10),KAT(10),UP(10,10),EPL(10)        IMEL0030
      EQUIVALENCE (TU(181),TF(1)), (VNU(1),CIJ(1))                      IMEL0031
C                                                                       IMEL0032
      COMMON /KINCTX/ MT,FKF(50),FAK(50),FYK(50),PNU(10,50),RHU(10,50), IMEL0033
     1                PMR(50),PKKK(50)                                                *COR
C                                                                       IMEL0035        **-1
      EQUIVALENCE (B(1),X(1)), (GAMK(1),VLAM(1))                        IMEL0036
C                                                                       IMEL0037
      COMMON /DIFFER/ IC(11),ALPT(10),C(10),SORCE(6),RA(2),IM(10),     IMEL0038
     1                II,KK,J,VINT,YINT,JAT(10),LIM(10,10),FAMA(10),   IMEL0039
     2                FAMB(10),KPRA(2)                                 IMEL0040
C                                                                       IMEL0041
      DIMENSION ZTA(10),ATB(10),ZC(10)                                  IMEL0042
      EQUIVALENCE (TG(1),ATA(1)), (TG(11),ATB(1)), (TG(21),ATC(1))     IMEL0043
C                                                                       IMEL0044
      COMMON/CARKIN/ KRK(10),RGUCF,NCC                                  IMEL0046        **-1
      COMMON/STOPG/ PERCT,SIPER,CPER                                                  *COR
      DATA DC,EC,FC/4H SIL,4HICON,4H    /                                             *COR
      DATA AC,BC,CC/4H GRA,4HPHIT,4HE   /                               IMEL0048      **-1
      IF (NCC-1) 70,5,70                                                              *COR
    5 READ (KIN,135) IS                                                 IMEL0050      **-1
      IF (IS-10) 10,10,130                                              IMEL0051
   10 IF (IS) 25,15,25                                                  IMEL0052
   15 IS=ISS                                                            IMEL0053
      GO TO 70                                                                        *COR
```

```
      25    READ (KIN,140) (KAT(J),ATA(J),ATB(J),ATC(J),WAT(J),TK(J,1),TK(J,2)IMEL0059                **-5
           1,TK(J,3), I=1,IS)                                                 IMEL0060
            DO 37 I=1,IS                                                                              *COR
            IF (KAT(I)-14) 37,38,37                                                                   *COR
         37 IF (KRK(4) .LT. 8) GO TO 36                                                               *COR
            IS=IS+1                                                                                   *COR
            KAT(IS)=14                                                                                *COR
            ATA(IS)=DG                                                                                *COR
            ATB(IS)=EG                                                                                *COR
            ATC(IS)=FG                                                                                *COR
            WAT(IS)=20.09                                                                             *COR
            TK(IS,1)=0.0                                                                              *COR
            TK(IS,2)=0.0                                                                              *COR
            TK(IS,3)=-SIPER                                                                           *COR
            GO TO 36                                                                                  *COR
         38 IF (KRK(4) .EQ. 8) TK(I,3)=-SIPER                                                         *COR
         36 DO 45 I=1,IS                                                                              *COR
            IF (KAT(I)-6) 45,30,45                                                                    *COR
      30    ICAR=I                                                             IMEL0063              **-2
      45    CONTINUE                                                           IMEL0067              **-3
            IS=IS+1                                                          IMEL0068
            ISS=IS                                                           IMEL0069
            KAT(IS)=106                                                      IMEL0070
            ATA(IS)=AG                                                       IMEL0071
            ATB(IS)=BG                                                       IMEL0072
            ATC(IS)=CG                                                       IMEL0073
            WAT(IS)=12.011                                                   IMEL0074
            TK(IS,1)=0.0                                                     IMEL0075
            TK(IS,2)=0.0                                                     IMEL0076
            TK(IS,3)=TK(ICAR,3)                                              IMEL0077
            IF (KRK(4) .EQ. 8) TK(IS,3)=-CPER                                                         *COR
            TK(ICAR,2)=1.0                                                                            *COR
            TK(ICAR,3)=1.0E-14                                               IMEL0078
      70    DO 105 K=1,3                                                       IMEL0100              *-21
            VA=0.                                                            IMEL0101
            DO 90 J=1,IS                                                     IMEL0102
            IF (KAT(J) - 99) 75,85,75                                        IMEL0103
      75    IF (TK(J,K)) 80,90,85                                            IMEL0104
      80    VA=VA-TK(J,K)                                                    IMEL0105
            TK(J,K)=-TK(J,K)/WAT(J)                                          IMEL0106
            GO TO 90                                                         IMEL0107
      85    VA=VA+TK(J,K)*WAT(J)                                             IMEL0108
      90    CONTINUE                                                         IMEL0109
            IF (VA) 95,105,95                                                IMEL0110
      95    DO 100 J=1,IS                                                    IMEL0111
     100    TK(J,K)=TK(J,K)/VA                                               IMEL0112
     105    CONTINUE                                                         IMEL0113
            WRITE (KOUT,145) (KAT(J),ATA(J),ATB(J),ATC(J),WAT(J),TK(J,1),    IMEL0114
           1   TK(J,3),J=1,IS)                                               IMEL0115
            ISP=IS+1                                                         IMEL0116
            IF (KR(3)) 115,115,110                                           IMEL0117
     110    IF (KR(3) - 9) 125,115,125                                       IMEL0118
     115    CONTINUE                                                         IMEL0119
            DO 120 I=1,3                                                     IMEL0120
            DO 120 J=1,IS                                                    IMEL0121
            TC(I,J)=0.                                                       IMEL0122
            DO 120 K=1,IS                                                    IMEL0123
```

```
112.     120   TG(I,L)=TG(I,L)+UM(I,K)*TK(K,L)                                  IMEL0124
113.     125   RETURN                                                           IMEL0125
114.     130   WRITE (KOUT,150)                                                 IMEL0126
115.           STOP                                                             IMEL0127
116.     C                                                                      IMEL0128
117.     135   FORMAT  (I3)                                                     IMEL0129
118.     140   FORMAT (I3,3A4,4E10.5)                                           IMEL0130
119.     145   FORMAT (54H0RELATIVE ELEMENTAL COMPOSITIONS, ATOMIC WTS/UNIT MASS IMEL0131
120.          1 /6X6HAT.NO.3X7HELEMENT4X9HATOMIC WTSX21HEDGE GAS      SURFACE/(7XIMEL0132
121.          213,3X3A4,F10.5,2F13.7))                                         IMEL0133
122.     150   FORMAT (/////40X,31HPROGRAM LIMITED TO 10 ELEMENTS  )            IMEL0134
123.           END                                                              IMEL0135
```

```
      SUBROUTINE  INPUT                                                 INPU0001
      COMMON/ACE1/GAMEX,REEX,PCH,ACHSQ,SQMAX,SXF                        INPU0003   **-1
C                                                                       INPU0004
      REAL MEIA(1),MEIB(1),EEIB(1),TAU(10,10)                           INPU0005
      EQUIVALENCE (MEIA(1),A(1)), (MEIB(1),A(51)), (EEIB(1),A(101)),    INPU0006
     1(TAU(1),A(151))                                                   INPU0007
      DIMENSION TE(190),CIJ(180,1)                                      INPU0008
      DIMENSION X(1),VLAM(180,1)                                        INPU0009
C                                                                       INPU0010
      COMMON           FAMDA(180),FAMDB(180),PH(180,2),EC(180,2),       INPU0011
     1                 RD(180,2),SE(180,2),RF(180,2),TU(180,2),V1(180),  INPU0012
     2                 Y(180),WTM(180),VMU(180,10),FF(180),IEC(180),     INPU0013
     3                 IP(180),CP(180),H(180),SK(180),TC(180),VLUK(180),  INPU0014
     4                 E(180),LAMI(180),GAMK(1,1)                       INPU0015
C                                                                       INPU0016
      COMMON /PARAM1/ KIP,KOUT,JAN,NOL,KAE,IDC,N,KKX(3),KR(10),TILE(3),  INPU0017
     1                TTRIN,TTMAX,VISC,PR(1)                            INPU0018
C                                                                       INPU0019
      COMMON /PARAM2/ ...,SCH,PHD,VEL,R1,REF,FFA,IS,ISP,P,T,STF,WTP,    INPU0020
     1                EL,ENL,ELIP,NC,IEL,ISPG,KPALP,CPF,IRF,IFR,AA,ITS,  INPU0021
     2                IN,IT,TT,CODE,HFELT,SFELT,IMAX,TMIN,RELT,SUXM,    INPU0022
     3                SUPL,JF,HG,CPG,SVA,SVP,SVC,SVD,SUEC,NKC,SA1,      INPU0023
     4                VMACH,KRZZ,SPI,GAM,THT,MX,DMCHT,HCP,NCV,TMT,      INPU0024
     5                IER7,NOAT,SR1,IXG,SV1,KKJ,IXC,NXG,SH1,NOATO,      INPU0025
     6                SA2,FFF,WS,RV,CMF,VA,HOS,PUP1,PUP2,FP,TRCJC,      INPU0026
     7                ISP2,WTG,VMU2,WTL                                 INPU0027
C                                                                       INPU0028
      COMMON /ARRAYS/ A(16,16),B(16),W(3),XC(50),XG(50),ZKE(10),        INPU0029
     1                TLO(10),DMCLO(10),WALJP(10),FR(10),ALP(10),       INPU0030
     2                GAM9(10),GAMF(10),TC(10,3),TK(10,3),WAT(10),      INPU0031
     3                IR(10),IGAT(10),KAT(10),UR(10,10),FRL(10)         INPU0032
      EQUIVALENCE (TE(181),TE(1)), (VMU(1),CIJ(1))                      INPU0033
C                                                                       INPU0034
      COMMON /KINETX/ RT,FKF(50),FAK(50),FXK(50),PFU(10,50),RKU(10,50),  INPU0035
     1                PXP(50),PKKK(50)                                  *COR
C                                                                       INPU0037   **-1
      EQUIVALENCE (B(1),X(1)), (GAMK(1),VLAM(1))                        INPU0038
C                                                                       INPU0039
      COMMON /DIFFER/ IC(11),ALPT(10),C(10),SORCE(8),RA(2),IM(10),      INPU0040
     1                II,KK,J,VIBT,YINT,JAT(10),LIM(10,10),FAMA(10),    INPU0041
     2                FAMB(10),KPHA(2)                                  INPU0042
C                                                                       INPU0043
      DIMENSION ATA(10),ATB(10),ATC(10)                                 INPU0044
      EQUIVALENCE (TE(1),ATA(1)), (TE(11),ATB(1)), (TE(21),ATC(1))      INPU0045
C                                                                       INPU0046
      COMMON /CARRIE/ KPK(10),KOUCM,NCC                                 INPU0047
      DIMENSION ALPTU(7,345),JATU(7,345),SORCU(8,345),AFOAD(345),       *COR
     *AFCBU(345),SRU(2,345),RRF(2,345),RCF(2,345),PDU(2,345),REU(2,345),  *COR
     *REF(2,345),TUU(2,345),KPHAU(2,345)                                *COR
      DIMENSION ALPTX(2415),JATX(2415),SORCX(2760),RAX(690),REX(690),    *COR
     *RCX(690),PDX(690),PEX(690),FEX(690),TUX(690),KPHAX(690)           *COR
C                                                                       INPU0055   **-7
      EQUIVALENCE  (ALPTX,ALPTE),  (JATX,JATE),  (SORCX,SORCE),         INPU0056
     1             (RAX,RAD),      (REX,REF),    (RCX,RCF),           INPU0057
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     2              (REX,REU),      (REX,REV),      (REX,REW),                  INPU0058
     3              (TUX,TUU),      (XPUAX,XPHAS)                               INPU0059
C                                                                                INPU0060
      DATA (ALPIX(I),I=1,139)/                                                                *COR
     * 1.. 2.. 0.. 0.. 0.. 0.. 0.. 2.. 0.. 0.. 0.. 0.. 0.. 0.. 2.. 1..  INPU0062            *COR
     * 0.. 0.. 0.. 0.. 0.. 1.. 1.. 0.. 0.. 0.. 0.. 0.. 1.. 0.. 0.. 0..  INPU0063            *COR
     * 0.. 0.. 0.. 2.. 2.. 0.. 0.. 0.. 0.. 0.. 1.. 1.. 0.. 0.. 0.. 0..  INPU0064            *COR
     * 0.. 1.. 1.. 0.. 0.. 0.. 0.. 0.. 1.. 0.. 0.. 0.. 0.. 0.. 0.. 2..  INPU0065            *COR
     * 0.. 0.. 0.. 0.. 0.. 0.. 3.. 0.. 0.. 0.. 0.. 0.. 0.. 4.. 0.. 0..  INPU0066            *COR
     * 0.. 0.. 0.. 0.. 5.. 0.. 0.. 0.. 0.. 0.. 0..                                        *COR
     * 1.. 0.. 0.. 0.. 0.. 0.. 0.. 1.. 1.. 0.. 0.. 0.. 0.. 0.. 1.. 1..  INPU0068            *COR
     * 0.. 0.. 0.. 0.. 0.. 1.. 1.. 1.. 0.. 0.. 0.. 0.. 1.. 1.. 2.. 0..  INPU0069            *COR
     * 0.. 0.. 0.. 1.. 1.. 1.. 0.. 0.. 0.. 0.. 0.. 1.. 1.. 0.. 0.. 0./  INPU0070            *COR
      DATA (ALPIX(I),I=140,283)/                                                          *COR
     * 0.. 1.. 2.. 1.. 0.. 0.. 0.. 0.. 1.. 3.. 0.. 0.. 0.. 0.. 0.. 1..  INPU0072            *COR
     * 1.. 0.. 0.. 0.. 0.. 0.. 1.. 1.. 1.. 0.. 0.. 0.. 0.. 1.. 2.. 0..  INPU0073            *COR
     * 0.. 0.. 0.. 0.. 1.. 3.. 0.. 0.. 0.. 0.. 0.. 1.. 1.. 0.. 0.. 0..  INPU0074            *COR
     * 0.. 0.. 1.. 1.. 1.. 0.. 0.. 0.. 0.. 1.. 1.. 2.. 0.. 0.. 0.. 0..  INPU0075            *COR
     * 1.. 1.. 0.. 0.. 0.. 0.. 0.. 1.. 1.. 0.. 0.. 0.. 0.. 0.. 2.. 0..  INPU0076            *COR
     * 0.. 0.. 0.. 0.. 0.. 2.. 1.. 0.. 0.. 0.. 0.. 0.. 2.. 2.. 0.. 0..  INPU0077            *COR
     * 0.. 0.. 0.. 1.. 0.. 0.. 0.. 0.. 0.. 1.. 1.. 0.. 0.. 0.. 0.. 0..  INPU0078            *COR
     * 0.. 1.. 1.. 1.. 0.. 0.. 0.. 0.. 1.. 1.. 2.. 0.. 0.. 0.. 0.. 1..  INPU0079            *COR
     * 1.. 1.. 0.. 0.. 0.. 0.. 1.. 2.. 0.. 0.. 0.. 0.. 0.. 1.. 2.. 1./  INPU0080            *COR
      DATA (ALPIX(I),I=284,443)/                                                          *COR
     * 0.. 0.. 0.. 0.. 1.. 3.. 0.. 0.. 0.. 0.. 0.. 1.. 1.. 0.. 0.. 0..  INPU0082            *COR
     * 0.. 0.. 1.. 1.. 1.. 0.. 0.. 0.. 0.. 1.. 2.. 0.. 0.. 0.. 0.. 0..  INPU0083            *COR
     * 1.. 3.. 0.. 0.. 0.. 0.. 0.. 1.. 1.. 0.. 0.. 0.. 0.. 0.. 1.. 1..  INPU0084            *COR
     * 1.. 0.. 0.. 0.. 0.. 1.. 1.. 2.. 0.. 0.. 0.. 0.. 1.. 2.. 0.. 0..  INPU0085            *COR
     * 0.. 0.. 0.. 1.. 2.. 2.. 0.. 0.. 0.. 0.. 1.. 3.. 0.. 0.. 0.. 0..  INPU0086            *COR
     * 0.. 1.. 2.. 3.. 0.. 0.. 0.. 0.. 1.. 1.. 0.. 0.. 0.. 0.. 0.. 1..  INPU0087            *COR
     * 1.. 0.. 0.. 0.. 0.. 0.. 2.. 0.. 0.. 0.. 0.. 0.. 0.. 2.. 4.. 0..  INPU0088            *COR
     * 0.. 0.. 0.. 0.. 2.. 4.. 0.. 0.. 0.. 0.. 0.. 2.. 2.. 0.. 0.. 0..  INPU0089            *COR
     * 0.. 0.. 2.. 3.. 0.. 0.. 0.. 0.. 0.. 3.. 3.. 0.. 0.. 0.. 0.. 0..  INPU0090            *COR
     * 3.. 3.. 3.. 0.. 0.. 0.. 0.. 3.. 3.. 0.. 0.. 0.. 0.. 0.. 3.. 0./  INPU0091            *COR
      DATA (ALPIX(I),I=444,587)/                                                          *COR
     * 3.. 0.. 0.. 0.. 0.. 3.. 0.. 0.. 0.. 0.. 0.. 0..10..10.. 0.. 0..  INPU0093            *COR
     * 0.. 0.. 0.. 1.. 0.. 0.. 0.. 0.. 0.. 2.. 1.. 0.. 0.. 0.. 0.. 0..  INPU0094            *COR
     * 0.. 1.. 1.. 0.. 0.. 0.. 0.. 0.. 1.. 1.. 1.. 0.. 0.. 0.. 0.. 1..  INPU0095            *COR
     * 2.. 0.. 0.. 0.. 0.. 0.. 1.. 1.. 0.. 0.. 0.. 0.. 0.. 1.. 2.. 0..  INPU0096            *COR
     * 0.. 0.. 1.. 0.. 1.. 1.. 0.. 0.. 0.. 0.. 0.. 1.. 1.. 1.. 0.. 0..  INPU0097            *COR
     * 0.. 0.. 0.. 0.. 1.. 2.. 0.. 0.. 0.. 1.. 2.. 2.. 0.. 0.. 0.. 0..  INPU0098            *COR
     * 1.. 1.. 0.. 0.. 0.. 0.. 0.. 2.. 4.. 0.. 0.. 0.. 0.. 2.. 2.. 0..  INPU0099            *COR
     * 0.. 0.. 0.. 0.. 0.. 3.. 3.. 0.. 0.. 0.. 0.. 0.. 0.. 3.. 0.. 0..  INPU0100            *COR
     * 0.. 0.. 0.. 5.. 5.. 0.. 0.. 0.. 0.. 0.. 0.. 0.. 0.. 0.. 0.. 0./  INPU0101            *COR
      DATA (ALPIX(I),I=588,747)/                                                          *COR
     * 0.. 1.. 1.. 0.. 0.. 0.. 0.. 0.. 1.. 1.. 1.. 1.. 0.. 0.. 0.. 1..  INPU0103            *COR
     * 1.. 3.. 0.. 0.. 0.. 0.. 1.. 1.. 1.. 0.. 0.. 0.. 0.. 1.. 2.. 1..  INPU0104            *COR
     * 0.. 0.. 0.. 0.. 1.. 3.. 1.. 0.. 0.. 0.. 0.. 1.. 3.. 0.. 0.. 0..  INPU0105            *COR
     * 0.. 0.. 1.. 1.. 0.. 0.. 0.. 0.. 0.. 1.. 1.. 1.. 0.. 0.. 0.. 0..  INPU0106            *COR
     * 1.. 2.. 0.. 0.. 0.. 0.. 0.. 1.. 2.. 1.. 0.. 0.. 0.. 0.. 1.. 2..  INPU0107            *COR
     * 0.. 0.. 0.. 0.. 0.. 1.. 0.. 0.. 0.. 0.. 0.. 0.. 1.. 1.. 0.. 0..  INPU0108            *COR
     * 0.. 0.. 0.. 1.. 1.. 1.. 2.. 0.. 0.. 0.. 1.. 1.. 2.. 1.. 0.. 0..  INPU0109            *COR
     * 0.. 1.. 1.. 3.. 0.. 0.. 0.. 0.. 1.. 1.. 1.. 1.. 0.. 0.. 0.. 1..  INPU0110            *COR
     * 1.. 3.. 0.. 0.. 0.. 0.. 1.. 1.. 1.. 0.. 0.. 0.. 0.. 1.. 2.. 1./  INPU0111            *COR
     * 1.. 0.. 0.. 0.. 1.. 1.. 1.. 0.. 0.. 0.. 0.. 1.. 2.. 0.. 0.. 0./  INPU0112            *COR
      DATA (ALPIX(I),I=748,891)/                                                          *COR
     * 0.. 0.. 1.. 2.. 1.. 1.. 0.. 0.. 0.. 1.. 2.. 2.. 0.. 0.. 0.. 0..  INPU0114            *COR
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      * 1.,  2.,  2.,  0.,  0.,  0.,  0.,  1.,  2.,  1.,  0.,  0.,  0.,  0.,  1.,  3.,   INPU0116  *COR
      * 0.,  0.,  0.,  0.,  0.,  1.,  3.,  1.,  0.,  0.,  0.,  0.,  1.,  3.,  3.,  1.,   INPU0117  *COR
      * 0.,  0.,  0.,  1.,  3.,  1.,  0.,  0.,  0.,  0.,  1.,  3.,  3.,  1.,  0.,  0.,   INPU0118  *COR
      * 0.,  1.,  4.,  0.,  0.,  0.,  0.,  0.,  1.,  1.,  0.,  0.,  0.,  0.,  0.,  2.,   INPU0119  *COR
      * 2.,  0.,  0.,  0.,  0.,  0.,  2.,  4.,  0.,  0.,  0.,  0.,  0.,  2.,  4.,  0.,   INPU0120  *COR
      * 0.,  0.,  0.,  0.,  2.,  4.,  1.,  0.,  0.,  0.,  0.,  2.,  2.,  0.,  0.,  0.,   INPU0121  *COR
      * 0.,  0.,  3.,  2.,  0.,  0.,  0.,  0.,  0.,  4.,12.,  1.,  0.,  0.,  0.,  0.,   INPU0122  *COR
      * 4.,  2.,  0.,  0.,  0.,  0.,  0.,  1.,  0.,  0.,  0.,  0.,  0.,  0.,  1.,  1./  INPU0123  *COR
       DATA (ALPTX(I),I=892,1051)/                                                                *COR
      * 0.,  0.,  0.,  0.,  0.,  1.,  1.,  2.,  0.,  0.,  0.,  0.,  1.,  1.,  3.,  0.,   INPU0125  *COR
      * 0.,  0.,  0.,  1.,  3.,  0.,  0.,  0.,  0.,  0.,  1.,  3.,  1.,  0.,  0.,  0.,   INPU0126  *COR
      * 0.,  1.,  1.,  1.,  0.,  0.,  0.,  0.,  1.,  3.,  1.,  0.,  0.,  0.,  0.,  1.,   INPU0127  *COR
      * 1.,  0.,  0.,  0.,  0.,  0.,  1.,  1.,  1.,  0.,  0.,  0.,  0.,  1.,  1.,  1.,   INPU0128  *COR
      * 0.,  0.,  0.,  0.,  1.,  1.,  0.,  0.,  0.,  0.,  1.,  2.,  0.,  0.,  0.,  0.,   INPU0129  *COR
      * 0.,  0.,  1.,  1.,  0.,  0.,  0.,  0.,  0.,  2.,  2.,  1.,  0.,  0.,  0.,  0.,   INPU0130  *COR
      * 2.,  2.,  0.,  0.,  0.,  0.,  0.,  2.,  1.,  0.,  0.,  0.,  0.,  0.,  2.,  1.,   INPU0131  *COR
      * 0.,  0.,  0.,  0.,  0.,  3.,  1.,  1.,  0.,  0.,  0.,  0.,  3.,  1.,  1.,  0.,   INPU0132  *COR
      * 0.,  0.,  0.,  3.,  3.,  0.,  0.,  0.,  0.,  0.,  0.,  4.,  1.,  0.,  0.,  0.,   INPU0133  *COR
      * 0.,  1.,  0.,  0.,  0.,  0.,  0.,  0.,  1.,  1.,  1.,  0.,  0.,  0.,  0.,  1./  INPU0134  *COR
       DATA (ALPTX(I),I=1052,1195)/                                                               *COR
      * 3.,  1.,  0.,  0.,  0.,  0.,  1.,  1.,  0.,  0.,  0.,  0.,  0.,  1.,  1.,  1.,   INPU0136  *COR
      * 0.,  0.,  0.,  0.,  1.,  1.,  0.,  0.,  0.,  0.,  0.,  1.,  1.,  1.,  0.,  0.,   INPU0137  *COR
      * 0.,  0.,  4.,  1.,  0.,  0.,  0.,  0.,  0.,  1.,  1.,  0.,  0.,  0.,  0.,  0.,   INPU0138  *COR
      * 1.,  1.,  0.,  0.,  0.,  0.,  0.,  2.,  2.,  1.,  0.,  0.,  0.,  0.,  2.,  2.,   INPU0139  *COR
      * 0.,  0.,  0.,  0.,  0.,  2.,  1.,  0.,  0.,  0.,  0.,  0.,  2.,  1.,  0.,  0.,   INPU0140  *COR
      * 0.,  0.,  0.,  3.,  1.,  1.,  0.,  0.,  0.,  0.,  3.,  3.,  0.,  0.,  0.,  0.,   INPU0141  *COR
      * 0.,  3.,  1.,  0.,  0.,  0.,  0.,  0.,  1.,  0.,  0.,  0.,  0.,  0.,  0.,  1.,   INPU0142  *COR
      * 1.,  0.,  0.,  0.,  0.,  0.,  1.,  1.,  1.,  0.,  0.,  0.,  0.,  1.,  1.,  0.,   INPU0143  *COR
      * 0.,  0.,  0.,  0.,  1.,  1.,  0.,  0.,  0.,  0.,  0.,  1.,  1.,  0.,  0.,  0./  INPU0144  *COR
       DATA (ALPTX(I),I=1196,1355)/                                                               *COR
      * 0.,  0.,  2.,  2.,  2.,  0.,  0.,  0.,  0.,  2.,  1.,  0.,  0.,  0.,  0.,  0.,   INPU0146  *COR
      * 2.,  2.,  1.,  0.,  0.,  0.,  0.,  3.,  1.,  0.,  0.,  0.,  0.,  0.,  4.,  2.,   INPU0147  *COR
      * 0.,  0.,  0.,  0.,  0.,  4.,  1.,  0.,  0.,  0.,  0.,  0.,  1.,  0.,  0.,  0.,   INPU0148  *COR
      * 0.,  0.,  0.,  1.,  1.,  0.,  0.,  0.,  0.,  0.,  0.,  1.,  1.,  0.,  0.,  0.,   INPU0149  *COR
      * 0.,  2.,  0.,  0.,  0.,  0.,  0.,  0.,  2.,  1.,  0.,  0.,  0.,  0.,  0.,  1.,   INPU0150  *COR
      * 0.,  0.,  0.,  0.,  0.,  0.,  1.,  1.,  0.,  0.,  0.,  0.,  0.,  1.,  2.,  0.,   INPU0151  *COR
      * 0.,  0.,  0.,  0.,  1.,  1.,  0.,  0.,  0.,  0.,  0.,  2.,  1.,  0.,  0.,  0.,   INPU0152  *COR
      * 0.,  0.,  2.,  3.,  0.,  0.,  0.,  0.,  0.,  2.,  4.,  0.,  0.,  0.,  0.,  0.,   INPU0153  *COR
      * 2.,  5.,  0.,  0.,  0.,  0.,  0.,  1.,  0.,  0.,  0.,  0.,  0.,  1.,  1.,  1.,   INPU0154  *COR
      * 0.,  0.,  0.,  0.,  0.,  2.,  1.,  0.,  0.,  0.,  0.,  0.,  3.,  0.,  0.,  0./  INPU0155  *COR
       DATA (ALPTX(I),I=1356,1499)/                                                               *COR
      * 0.,  0.,  0.,  1.,  0.,  0.,  0.,  0.,  0.,  2.,  0.,  0.,  0.,  0.,  0.,  0.,   INPU0157  *COR
      * 0.,  3.,  0.,  0.,  0.,  0.,  0.,  0.,  1.,  2.,  2.,  0.,  0.,  0.,  0.,  1.,   INPU0158  *COR
      * 2.,  1.,  0.,  0.,  0.,  0.,  1.,  2.,  1.,  0.,  0.,  0.,  0.,  1.,  1.,  1.,   INPU0159  *COR
      * 0.,  0.,  0.,  0.,  1.,  1.,  1.,  0.,  0.,  0.,  0.,  2.,  6.,  0.,  0.,  0.,   INPU0160  *COR
      * 0.,  0.,  1.,  1.,  2.,  0.,  0.,  0.,  0.,  1.,  1.,  2.,  0.,  0.,  0.,  0.,   INPU0161  *COR
      * 1.,  4.,  1.,  0.,  0.,  0.,  0.,  1.,  1.,  0.,  0.,  0.,  0.,  0.,  1.,  2.,   INPU0162  *COR
      * 1.,  1.,  0.,  0.,  0.,  2.,  1.,  4.,  0.,  0.,  0.,  0.,  1.,  3.,  1.,  0.,   INPU0163  *COR
      * 0.,  0.,  0.,  1.,  1.,  2.,  0.,  0.,  0.,  2.,  1.,  0.,  0.,  0.,  0.,  0.,   INPU0164  *COR
      * 0.,  3.,  1.,  2.,  3.,  0.,  0.,  0.,  3.,  2.,  1.,  3.,  0.,  0.,  0.,  3./  INPU0165  *COR
       DATA (ALPTX(I),I=1500,1659)/                                                               *COR
      * 3.,  3.,  0.,  0.,  0.,  0.,  1.,  1.,  3.,  0.,  0.,  0.,  0.,  1.,  1.,  1.,   INPU0167  *COR
      * 0.,  0.,  0.,  0.,  1.,  2.,  0.,  0.,  0.,  0.,  0.,  1.,  1.,  0.,  0.,  0.,   INPU0168  *COR
      * 0.,  0.,  1.,  1.,  2.,  0.,  0.,  0.,  0.,  1.,  1.,  2.,  0.,  0.,  0.,  0.,   INPU0169  *COR
      * 1.,  1.,  3.,  0.,  0.,  0.,  0.,  2.,  1.,  0.,  0.,  0.,  0.,  0.,  2.,  1.,   INPU0170  *COR
      * 1.,  0.,  0.,  0.,  0.,  3.,  1.,  0.,  0.,  0.,  0.,  0.,  1.,  1.,  1.,  0.,   INPU0171  *COR
      * 0.,  0.,  0.,  4.,  2.,  0.,  0.,  0.,  0.,  0.,  1.,  2.,  0.,  0.,  0.,  0.,   INPU0172  *COR
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      * 0.. 2.. 2.. 0.. 0.. 0.. 0.. 0.. 2.. 4.. 0.. 0.. 0.. 0.. 0.. 1..  INPU0173  *COR
      * 3.. 0.. 0.. 0.. 0.. 0.. 1.. 4.. 1.. 0.. 0.. 0.. 0.. 1.. 2.. 0..  INPU0174  *COR
      * 0.. 0.. 6.. 0.. 1.. 3.. 0.. 0.. 0.. 0.. 0.. 1.. 1.. 0.. 0.. 0..  INPU0175  *COR
      * 0.. 0.. 2.. 2.. 0.. 0.. 0.. 0.. 0.. 2.. 2.. 0.. 0.. 0.. 0.. 0./  INPU0176  *COR
       DATA (ALPTX(I),I=1660,1803)/                                                  *COR
      * 1.. 2.. 1.. 0.. 0.. 0.. 0.. 2.. 4.. 4.. 0.. 0.. 0.. 0.. 1.. 1..  INPU0178  *COR
      * 2.. 0.. 0.. 0.. 0.. 1.. 1.. 2.. 0.. 0.. 0.. 0.. 2.. 1.. 0.. 0..  INPU0179  *COR
      * 0.. 0.. 0.. 2.. 2.. 1.. 0.. 0.. 0.. 0.. 1.. 1.. 0.. 0.. 0.. 0..  INPU0180  *COR
      * 0.. 1.. 2.. 0.. 0.. 0.. 0.. 2.. 1.. 0.. 0.. 0.. 0.. 0.. 0.. 1..  INPU0181  *COR
      * 5.. 0.. 0.. 0.. 0.. 0.. 1.. 1.. 0.. 0.. 0.. 0.. 0.. 1.. 2.. 0..  INPU0182  *COR
      * 0.. 0.. 0.. 0.. 1.. 1.. 1.. 0.. 0.. 0.. 0.. 2.. 1.. 0.. 0.. 0..  INPU0183  *COR
      * 0.. 0.. 1.. 1.. 0.. 0.. 0.. 0.. 0.. 1.. 2.. 0.. 0.. 0.. 0.. 0..  INPU0184  *COR
      * 2.. 1.. 0.. 0.. 0.. 0.. 0.. 2.. 1.. 0.. 0.. 0.. 0.. 0.. 1.. 2..  INPU0185  *COR
      * 0.. 0.. 0.. 0.. 0.. 2.. 4.. 0.. 0.. 0.. 0.. 0.. 2.. 6.. 0.. 0./  INPU0186  *COR
       DATA (ALPTX(I),I=1804,2026)/                                                  *COR
      * 0.. 0.. 0.. 2.. 1.. 1.. 0.. 0.. 0.. 0.. 1.. 2.. 0.. 0.. 0.. 0..  INPU0188  *COR
      * 0.. 2.. 2.. 0.. 0.. 0.. 0.. 0.. 2.. 1.. 1.. 0.. 0.. 0.. 0.. 1..  INPU0189  *COR
      * 1.. 1.. 0.. 0.. 0.. 0.. 1.. 1.. 1.. 0.. 0.. 0.. 0.. 2.. 3.. 1..  INPU0190  *COR
      * 0.. 0.. 0.. 0.. 3.. 1.. 0.. 0.. 0.. 0.. 0.. 2.. 6.. 0.. 0.. 0..  INPU0191  *COR
      * 0.. 0.. 3.. 1.. 1.. 0.. 0.. 0.. 0.. 2.. 0.. 0.. 0.. 0.. 0.. 0..  INPU0192  *COR
      * 2.. 0.. 0.. 0.. 0.. 0.. 0.. 2.. 0.. 0.. 0.. 0.. 0.. 2.. 0.. 0..  INPU0193  *COR
      * 0.. 0.. 0.. 0.. 0.. 1.. 1.. 1.. 0.. 0.. 0.. 0.. 3.. 0.. 0.. 0..  INPU0194  *COR
      * 0.. 0.. 0.. 2.. 4.. 1.. 0.. 0.. 0.. 0.. 1.. 0.. 0.. 0.. 0.. 0..  INPU0195  *COR
      * 0.. 3.. 2.. 0.. 0.. 0.. 0.. 0.. 6.. 2.. 0.. 0.. 0.. 0.. 0.. 1..           *COR
      * 3.. 0.. 0.. 0.. 0.. 0.. 2.. 3.. 0.. 0.. 0.. 0.. 0.. 3.. 3.. 0..           *COR
      * 0.. 0.. 0.. 0.. 4.. 3.. 0.. 0.. 0.. 0.. 0.. 5.. 3.. 0.. 0.. 0..           *COR
      * 0.. 0.. 1.. 4.. 0.. 0.. 0.. 0.. 0.. 2.. 4.. 0.. 0.. 0.. 0.. 0..           *COR
      * 0.. 1.. 0.. 0.. 0.. 0.. 0.. 0.. 2.. 2.. 0.. 0.. 0.. 0.. 0.. 1..  INPU0196  *COR
      * 6.. 3.. 0.. 0.. 0.. 0.. 1.. 1.. 1.. 0.. 0.. 0.. 0.. 3.. 3.. 3./  INPU0197  *COR
       DATA (ALPTX(I),I=2027,2170)/                                                  *COR
      * 0.. 0.. 0.. 0.. 1.. 1.. 0.. 0.. 0.. 0.. 0.. 2.. 2.. 0.. 0.. 0..  INPU0199  *COR
      * 0.. 0.. 1.. 4.. 1.. 0.. 0.. 0.. 0.. 1.. 4.. 1.. 4.. 0.. 0.. 0..  INPU0200  *COR
      * 1.. 1.. 4.. 0.. 0.. 0.. 0.. 1.. 2.. 2.. 0.. 0.. 0.. 0.. 1.. 3..  INPU0201  *COR
      * 0.. 0.. 0.. 0.. 0.. 1.. 3.. 0.. 0.. 0.. 0.. 0.. 1.. 1.. 2.. 0..  INPU0202  *COR
      * 0.. 0.. 0.. 1.. 1.. 0.. 0.. 0.. 0.. 0.. 2.. 5.. 1.. 0.. 0.. 0..  INPU0203  *COR
      * 0.. 3.. 0.. 0.. 0.. 0.. 0.. 0.. 1.. 1.. 0.. 0.. 0.. 0.. 0.. 1..  INPU0204  *COR
      * 0.. 0.. 0.. 0.. 0.. 0.. 3.. 1.. 0.. 0.. 0.. 0.. 0.. 4.. 3.. 0..  INPU0205  *COR
      * 0.. 0.. 0.. 0.. 2.. 4.. 1.. 0.. 0.. 0.. 0.. 1.. 0.. 0.. 0.. 0..  INPU0206  *COR
      * 0.. 0.. 2.. 3.. 0.. 0.. 0.. 0.. 0.. 1.. 0.. 0.. 0.. 0.. 0.. 0./  INPU0207  *COR
       DATA (ALPTX(I),I=2171,2330)/                                                  *COR
      * 2.. 3.. 0.. 0.. 0.. 0.. 0.. 1.. 4.. 0.. 0.. 0.. 0.. 0.. 1.. 0..  INPU0209  *COR
      * 0.. 0.. 0.. 0.. 0.. 1.. 1.. 0.. 0.. 0.. 0.. 0.. 1.. 2.. 0.. 0..  INPU0210  *COR
      * 0.. 0.. 0.. 3.. 2.. 0.. 0.. 0.. 0.. 0.. 1.. 1.. 0.. 0.. 0.. 0..  INPU0211  *COR
      * 0.. 1.. 1.. 0.. 0.. 0.. 0.. 0.. 1.. 1.. 1.. 0.. 0.. 0.. 0.. 2..  INPU0212  *COR
      * 1.. 0.. 0.. 0.. 0.. 0.. 2.. 1.. 0.. 0.. 0.. 0.. 0.. 1.. 0.. 0..  INPU0213  *COR
      * 0.. 0.. 0.. 0.. 1.. 1.. 2.. 0.. 0.. 0.. 0.. 1.. 2.. 0.. 0.. 0..  INPU0214  *COR
      * 0.. 0.. 1.. 2.. 0.. 0.. 0.. 0.. 0.. 2.. 3.. 1.. 0.. 0.. 0.. 0..  INPU0215  *COR
      * 2.. 1.. 4.. 0.. 0.. 0.. 0.. 4.. 2.. 7.. 0.. 0.. 0.. 0.. 5.. 2..  INPU0216  *COR
      *10.. 0.. 0.. 0.. 0.. 0.. 4.. 2.,13.. 0.. 0.. 0.. 2.. 4.. 4.. 0..  INPU0217  *COR
      * 0.. 0.. 0.. 1.. 2.. 3.. 0.. 0.. 0.. 0.. 1.. 3.. 1.. 0.. 0.. 0./  INPU0218  *COR
       DATA (ALPTX(I),I=2331,2415)/                                                  *COR
      * 0.. 1.. 4.. 2.. 0.. 0.. 0.. 0.. 6.,13.. 2.. 0.. 0.. 0.. 0.. 2..  INPU0220  *COR
      * 3.. 6.. 0.. 0.. 0.. 0.. 3.. 3.. 3.. 0.. 0.. 0.. 0.,10..14.. 0..  INPU0221  *COR
      * 0.. 0.. 0.. 0.. 1.. 1.. 0.. 0.. 0.. 0.. 0.. 1.. 1.. 2.. 0.. 0..  INPU0222  *COR
      * 0.. 0.. 1.. 3.. 3.. 0.. 0.. 0.. 0.. 5.. 9.. 0.. 0.. 0.. 0.. 0..  INPU0223  *COR
      * 1.. 4.. 1.. 0.. 0.. 0.. 0.. 1.. 4.. 1.. 0.. 0.. 0.. 0.. 2.. 5..  INPU0224  *COR
      * 2.. 0.. 0.. 0.. 0./                                                       INPU0225  *COR
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      DATA (JATX(I),I=1,139)/
     *  6,  8,  0,  0,  0,  0,  0,  1,  0,  0,  0,  0,  0,  0,  1,  8,  INPU0227
     *  0,  0,  0,  0,  0,  6,  8,  0,  0,  0,  0,  0,106,  0,  0,  0,  INPU0228
     *  0,  0,  0,  6,  1,  0,  0,  0,  0,  0, 17,  1,  0,  0,  0,  0,  INPU0229
     *  0,  9,  1,  0,  0,  0,  0,  0,  6,  0,  0,  0,  0,  0,  0,  6,  INPU0230
     *  0,  0,  0,  0,  0,  0,  6,  0,  0,  0,  0,  0,  0,  6,  0,  0,  INPU0231
     *  0,  0,  0,  0,  6,  0,  0,  0,  0,  0,  0,                      
     * 13,  0,  0,  0,  0,  0,  0,  6, 13,  0,  0,  0,  0,  0, 13, 17,  INPU0234
     *  0,  0,  0,  0,  0, 15, 17,  9,  0,  0,  0,  0,  0, 13, 17,  9,  INPU0235
     *  0,  0,  0, 13, 17,  8,  0,  0,  0,  0, 13, 17,  0,  0,  0,  0/  INPU0236
      DATA (JATX(I),I=140,283)/
     *  0, 13, 17,  9,  0,  0,  0,  0, 13, 17,  0,  0,  0,  0,  0, 13,  INPU0238
     *  9,  0,  0,  0,  0,  0, 13,  9,  0,  0,  0,  0,  0, 13,  9,  0,  INPU0239
     *  0,  0,  0,  0, 13,  9,  0,  0,  0,  0,  0, 13,  1,  0,  0,  0,  INPU0240
     *  0,  0,995,  1,  8,  0,  0,  0,  0,  0, 13,  1,  8,  0,  0,  0,  INPU0241
     * 13,  7,  0,  0,  0,  0,  0, 15,  8,  0,  0,  0,  0,  0, 13, 17,  INPU0242
     *  0,  0,  0,  0,  0, 13,  9,  0,  0,  0,  0,  0, 13,  6,  0,  0,  INPU0243
     *  0,  0,  0,  5,  0,  0,  0,  0,  0,  0,  5, 17,  0,  0,  0,  0,  INPU0244
     *  0,  5, 17,  9,  0,  0,  0,  0,  5, 17,  9,  0,  0,  0,  0,  5,  INPU0245
     * 17,  8,  0,  0,  0,  0,  5, 17,  0,  0,  0,  0,  0,  5, 17,  9/  INPU0246
      DATA (JATX(I),I=284,443)/
     *  0,  0,  0,  0,  5, 17,  0,  0,  0,  0,  0,  5,  9,  0,  0,  0,  INPU0248
     *  0,  0,  5,  9,  8,  0,  0,  0,  0,  5,  9,  0,  0,  0,  0,  0,  INPU0249
     *  5,  9,  0,  0,  0,  0,  0,  5,  1,  0,  0,  0,  0,  0,  5,  1,  INPU0250
     *  8,  0,  0,  0,  0,  5,  1,  8,  0,  0,  0,  0,  5,  1,  0,  0,  INPU0251
     *  0,  0,  0,  5,  1,  8,  0,  0,  0,  0,  5,  1,  0,  0,  0,  0,  INPU0252
     *  0,  5,  1,  8,  0,  0,  0,  0,  5,  7,  0,  0,  0,  0,  0,  5,  INPU0253
     *  8,  0,  0,  0,  0,  0,  5,  0,  0,  0,  0,  0,  0,  5, 17,  8,  INPU0254
     *  0,  0,  0,  0,  5,  1,  0,  0,  0,  0,  0,  5,  8,  0,  0,  0,  INPU0255
     *  0,  0,  5,  8,  0,  0,  0,  0,  0,  5, 17,  8,  0,  0,  0,  0,  INPU0256
     *  8,  5,  9,  0,  0,  0,  0,  5,  1,  8,  0,  0,  0,  0,  5,  1/  INPU0257
      DATA (JATX(I),I=404,587)/
     *  7,  0,  0,  0,  0,  5,  1,  0,  0,  0,  0,  0,  5,  1,  0,  0,  INPU0259
     *  0,  0,  0,  4,  0,  0,  0,  0,  0,  0,  5,  4,  0,  0,  0,  0,  INPU0260
     *  0,  4, 17,  0,  0,  0,  0,  0,  4, 17,  9,  0,  0,  0,  0,  4,  INPU0261
     * 17,  0,  0,  0,  0,  0,  4,  9,  0,  0,  0,  0,  0,  4,  9,  0,  INPU0262
     *  0,  0,  0,  0,996,  1,  0,  0,  0,  0,  0,  4,  1,  8,  0,  0,  INPU0263
     *  0,  0,  4,  1,  0,  0,  0,  0,  0,  4,  1,  8,  0,  0,  0,  0,  INPU0264
     *  4,  8,  0,  0,  0,  0,  0,  4, 17,  0,  0,  0,  0,  0,  4,  8,  INPU0265
     *  0,  0,  0,  0,  0,  4,  8,  0,  0,  0,  0,  0,  4,  8,  0,  0,  INPU0266
     *  0,  0,  0,  4,  8,  0,  0,  0,  0,  0,  4,  8,  0,  0,  0,  0/  INPU0267
      DATA (JATX(I),I=588,747)/
     *  0,  6, 17,  0,  0,  0,  0,  0,  6, 17,  9,  8,  0,  0,  0,  6,  INPU0269
     * 17,  9,  0,  0,  0,  0,  6, 17,  7,  0,  0,  0,  0,  6, 17,  8,  INPU0270
     *  0,  0,  0,  0,  6, 17,  9,  0,  0,  0,  0,  6, 17,  0,  0,  0,  INPU0271
     *  0,  0,  6,  9,  0,  0,  0,  0,  0,  6,  9,  7,  0,  0,  0,  0,  INPU0272
     *  6,  9,  0,  0,  0,  0,  0,  6,  9,  8,  0,  0,  0,  6,  9,  0,  INPU0273
     *  0,  0,  0,  0,  0,  6,  9,  0,  0,  0,  0,  6,  6,  1,  0,  0,  INPU0274
     *  0,  0,  0,  6,  1, 17,  9,  0,  0,  0,  6,  1, 17,  9,  0,  0,  INPU0275
     *  0,  6,  1, 17,  0,  0,  0,  0,  6,  1,  9,  8,  0,  0,  0,  6,  INPU0276
     *  1,  9,  0,  0,  0,  0,  6,  1,  7,  0,  0,  0,  0,  6,  1,  7,  INPU0277
     *  8,  0,  0,  0,  6,  1,  8,  0,  0,  0,  0,  6,  1,  0,  0,  0/  INPU0278
      DATA (JATX(I),I=748,907)/
     *  0,  0,  6,  1, 17,  9,  0,  0,  0,  6,  1, 17,  0,  0,  0,  0,  INPU0280
     *  6,  1,  9,  0,  0,  0,  0,  6,  1,  8,  0,  0,  0,  0,  6,  1,  INPU0281
     *  0,  0,  0,  0,  0,  6,  1, 17,  0,  0,  0,  0,  6,  1, 17, 14,  INPU0282
     *  0,  0,  0,  6,  1,  9,  0,  0,  0,  0,  6,  1,  9, 14,  0,  0,  INPU0283
```

```
      *  0.  6.  1.  0.  0.  0.  0.  0.  6.  7.  0.  0.  0.  0.  0.  6.  INPUT0284  *COR
      *  9.  0.  0.  0.  0.  0.  6.  9.  0.  0.  0.  0.  0.  6.  1.  0.  INPUT0285  *COR
      *  0.  0.  0.  0.  6.  1.  8.  0.  0.  0.  0.  6.  7.  0.  0.  0.  INPUT0286  *COR
      *  0.  0.  6.  8.  0.  0.  0.  0.  0.  6.  1. 14.  0.  0.  0.  0.  INPUT0287  *COR
      *  6.  7.  0.  0.  0.  0.  0. 17.  0.  0.  0.  0.  0.  0. 17.  9/  INPUT0288  *COR
       DATA (JATX(I),I=832,1051)/                                                  *COR
      *  0.  0.  0.  0.  0. 17.  9.  3.  0.  0.  0.  0. 17.  9.  8.  0.  INPUT0290  *COR
      *  0.  0.  0. 17.  9.  0.  0.  0.  0.  0. 17.  9. 14.  0.  0.  0.  INPUT0291  *COR
      *  0. 17.  1.  6.  0.  0.  0.  0. 17.  1. 14.  0.  0.  0.  0. 17.  INPUT0292  *COR
      *  3.  0.  0.  0.  0.  0. 17.  3.  8.  0.  0.  0.  0. 17.  7.  6.  INPUT0293  *COR
      *  0.  0.  0.  0. 17.  8.  0.  0.  0.  0.  0. 17.  8.  0.  0.  0.  INPUT0294  *COR
      *  0.  0. 17. 14.  0.  0.  0.  0.  0. 17.  1. 14.  0.  0.  0.  0.  INPUT0295  *COR
      * 17.  3.  0.  0.  0.  0.  0. 17.  8.  6.  0.  0.  0.  0. 17. 14.  INPUT0296  *COR
      *  0.  0.  0.  0.  0. 17.  9. 14.  0.  0.  0.  0. 17.  1. 14.  0.  INPUT0297  *COR
      *  0.  0.  0. 17.  3.  0.  0.  0.  0.  0. 17. 14.  0.  0.  0.  0.  INPUT0298  *COR
      *  0.  9.  0.  0.  0.  0.  0.  0.  9.  1.  8.  0.  0.  0.  0.  9/  INPUT0299  *COR
       DATA (JATX(I),I=1052,1195)/                                                 *COR
      *  1. 14.  0.  0.  0.  0.  9.  3.  0.  0.  0.  0.  0.  9.  3.  8.  INPUT0301  *COR
      *  0.  0.  0.  0.  9.  7.  0.  0.  0.  0.  0.  9.  7.  8.  0.  0.  INPUT0302  *COR
      *  0.  0.  9. 14.  0.  0.  0.  0.  0.  9.  8.  0.  0.  0.  0.  0.  INPUT0303  *COR
      *  9. 14.  0.  0.  0.  0.  0.  9.  1. 14.  0.  0.  0.  0.  9.  3.  INPUT0304  *COR
      *  0.  0.  0.  0.  0.  9.  8.  0.  0.  0.  0.  0.  9. 14.  0.  0.  INPUT0305  *COR
      *  0.  0.  0.  9.  1. 14.  0.  0.  0.  0.  9.  3.  0.  0.  0.  0.  INPUT0306  *COR
      *  0.  9.  7.  0.  0.  0.  0.  0.  1.  0.  0.  0.  0.  0.  1.  INPUT0307  *COR
      *  3.  0.  0.  0.  0.  0.  1.  3.  8.  0.  0.  0.  0.  1.  7.  0.  INPUT0308  *COR
      *  0.  0.  0.  0.  1.  8.  0.  0.  0.  0.  0.  1. 14.  0.  0.  0/  INPUT0309  *COR
       DATA (JATX(I),I=1196,1355)/                                                 *COR
      *  0.  0.  1.  3.  8.  0.  0.  0.  0.  1.  7.  0.  0.  0.  0.  0.  INPUT0311  *COR
      *  1.  8.  0.  0.  0.  0.  0.  1.  7.  0.  0.  0.  0.  0.  1.  7.  INPUT0312  *COR
      *  0.  0.  0.  0.  0.  1. 14.  0.  0.  0.  0.  3.  0.  0.  0.  0.  INPUT0313  *COR
      *  0.  0.  0.  3.  7.  0.  0.  0.  0.  0.  3.  8.  0.  0.  0.  0.  INPUT0314  *COR
      *  0.  3.  0.  0.  0.  0.  0.  0.  3.  8.  0.  0.  0.  0.  0.  7.  INPUT0315  *COR
      *  0.  0.  0.  0.  0.  0.  7.  8.  0.  0.  0.  0.  0.  7.  8.  0.  INPUT0316  *COR
      *  0.  0.  0.  0.  7. 14.  0.  0.  0.  0.  0.  7.  8.  0.  0.  0.  INPUT0317  *COR
      *  0.  0.  7.  3.  0.  0.  0.  0.  0.  7.  8.  0.  0.  0.  0.  0.  INPUT0318  *COR
      *  7.  8.  0.  0.  0.  0.  0.  8.  0.  0.  0.  0.  0.  0.  8. 14.  INPUT0319  *COR
      *  0.  0.  0.  0.  0.  8. 14.  0.  0.  0.  0.  0.  8.  0.  0.  0/  INPUT0320  *COR
       DATA (JATX(I),I=1356,1499)/                                                 *COR
      *  0.  0.  0. 14.  0.  0.  0.  0.  0.  0. 14.  0.  0.  0.  0.  0.  INPUT0322  *COR
      *  0. 14.  0.  0.  0.  0.  0.  0.  6. 17.  3.  0.  0.  0.  0.  5.  INPUT0323  *COR
      *  9.  1.  0.  0.  0.  0.  5.  9.  8.  0.  0.  0.  0.  6. 17.  8.  INPUT0324  *COR
      *  0.  0.  0.  0.  6.  9.  8.  0.  0.  0.  0.  6.  9.  0.  0.  0.  INPUT0325  *COR
      *  0.  0.  9.  7.  8.  0.  0.  0.  0.  5.  3.  8.  0.  0.  0.  0.  INPUT0326  *COR
      * 13.  9.  3.  0.  0.  0.  0.  6.  5.  0.  0.  0.  0.  0.  5.  9.  INPUT0327  *COR
      *  1.  8.  0.  0.  0.  5.  4.  8.  0.  0.  0.  0.  4.  9.  3.  0.  INPUT0328  *COR
      *  0.  0.  0. 17.  7.  8.  0.  0.  0.  0.  9.  7.  0.  0.  0.  0.  INPUT0329  *COR
      *  0.  5.  9.  1.  8.  0.  0.  0.  5.  9.  1.  8.  0.  0.  0.  5/  INPUT0330  *COR
       DATA (JATX(I),I=1500,1659)/                                                 *COR
      *  1.  8.  0.  0.  0.  0.  9.  7.  8.  0.  0.  0.  0.  1.  7.  8.  INPUT0332  *COR
      *  0.  0.  0.  0.  5.  8.  0.  0.  0.  0.  0.  4.  7.  0.  0.  0.  INPUT0333  *COR
      *  0.  0.997.  1.  8.  0.  0.  0.  0.  1.  7.  8.  0.  0.  0.  0.  INPUT0334  *COR
      *  1.  7.  8.  0.  0.  0.  0.  4.  8.  0.  0.  0.  0.  0.  9.  8.  INPUT0335  *COR
      * 14.  0.  0.  0.  0.  9. 14.  0.  0.  0.  0.  0. 13.  1.  8.  0.  INPUT0336  *COR
      *  0.  0.  0.  9.  7.  0.  0.  0.  0.  0.  1.  8.  0.  0.  0.  0.  INPUT0337  *COR
      *  0.  3.  8.  0.  0.  0.  0.  0.  5.  9.  0.  0.  0.  0.  7.  INPUT0338  *COR
      *  8.  0.  0.  0.  0.  0.  6.  9.  8.  0.  0.  0.  0.  6. 17.  0.  INPUT0339  *COR
      *  0.  0.  0.  0.  6. 17.  0.  0.  0.  0.  0.998.  1.  0.  0.  0.  INPUT0340  *COR
```

```
      *  0.  0.  9.  7.  0.  0.  0.  0.  0.  1.  7.  0.  0.  0.  0.  0/  INPU0341                *COR
       DATA (JATX(I),I=1660,1803)/                                                             *COR
      *  5. 17.  1.  0.  0.  0.  0.  5.  1.  8.  0.  0.  0.  0. 13.  5.  INPU0343              *COR
      *  8.  0.  0.  0.  0.  5.  4.  8.  0.  0.  0.  0.  5.  8.  0.  0.  INPU0344              *COR
      *  0.  0.  0.  4.  9.  8.  0.  0.  0.  0.999.  1.  0.  0.  0.  0.  INPU0345              *COR
      *  0.  6.  7.  0.  0.  0.  0.  0.  6.  8.  0.  0.  0.  0.  0. 17.  INPU0346              *COR
      *  9.  0.  0.  0.  0.  0.  4.  1.  0.  0.  0.  0.  0.  9.  8.  0.  INPU0347              *COR
      *  0.  0.  0.  0.  3.  7.  8.  0.  0.  0.  0.  6.  1.  0.  0.  0.  INPU0348              *COR
      *  0.  0.  6. 14.  0.  0.  0.  0.  0.  6. 14.  0.  0.  0.  0.  0.  INPU0349              *COR
      *  6.  7.  0.  0.  0.  0.  0.  6. 14.  0.  0.  0.  0.  0.  7. 14.  INPU0350              *COR
      *  0.  0.  0.  0.  0.  6. 17.  0.  0.  0.  0.  0.  6. 17.  0.  0/  INPU0351              *COR
       DATA (JATX(I),I=1804,2026)/                                                             *COR
      *  0.  0.  0.  6.  1.  9.  0.  0.  0.  0. 13.  8.  0.  0.  0.  0.  INPU0353              *COR
      *  0.  6. 17.  0.  0.  0.  0.  0.  6.  1. 17.  0.  0.  0.  0.  6.  INPU0354              *COR
      *  1. 17.  0.  0.  0.  0.  6.  1.  9.  0.  0.  0.  0.  6.  9.  7.  INPU0355              *COR
      *  0.  0.  0.  0. 17. 14.  0.  0.  0.  0.  0. 13.  9.  0.  0.  0.  INPU0356              *COR
      *  0.  0.  9.  7.  8.  0.  0.  0.  0.  9.  0.  0.  0.  0.  0.  0.  INPU0357              *COR
      * 17.  0.  0.  0.  0.  0.  0.  7.  0.  0.  0.  0.  0.  0.  8.  0.  INPU0358              *COR
      *  0.  0.  0.  0.  0.  6.  7.  3.  0.  0.  0.  0.  7.  0.  0.  0.  INPU0359              *COR
      *  0.  0.  0.  5.  9.  8.  0.  0.  0.  0. 18.  0.  0.  0.  0.  0.  INPU0360              *COR
      *  0.  1.  6.  0.  0.  0.  0.  0.  1.  6.  0.  0.  0.  0.  0.  1.                       *COR
      *  6.  0.  0.  0.  0.  0.  1.  6.  0.  0.  0.  0.  0.  1.  6.  0.                       *COR
      *  0.  0.  0.  0.  1.  6.  0.  0.  0.  0.  0.  1.  6.  0.  0.  0.                       *COR
      *  0.  0.  1.  6.  0.  0.  0.  0.  0.  1.  6.  0.  0.  0.  0.                          *COR
      *  0.  2.  0.  0.  0.  0.  0.  0.  3.  8.  0.  0.  0.  0.  0. 13.  INPU0361              *COR
      *  9.  3.  0.  0.  0.  0. 13. 17.  8.  0.  0.  0.  0.  5.  1.  8/  INPU0362              *COR
       DATA (JATX(I),I=2027,2170)/                                                             *COR
      *  0.  0.  0.  0.  6. 14.  6.  0.  0.  0.  0.  6.  3.  0.  0.  0.  INPU0364              *COR
      *  0.  0. 17.  1.  7.  0.  0.  0.  0. 17.  1.  7.  8.  0.  0.  0.  INPU0365              *COR
      * 17.  3.  8.  0.  0.  0.  0.  4.  1.  8.  0.  0.  0.  0. 13. 17.  INPU0366              *COR
      *  0.  0.  0.  0.  0. 13.  9.  0.  0.  0.  0.  0.  0. 13.  3.  9.  INPU0367              *COR
      *  0.  0.  0. 13.  7.  0.  0.  0.  0.  0. 13.  8. 14.  0.  0.  0.  INPU0368              *COR
      *  6.  6. 13.  0.  0.  0.  0.  0.  5.  7.  0.  0.  0.  0.  0.  3.  INPU0369              *COR
      *  0.  0.  0.  0.  0.  0.  3.  7.  0.  0.  0.  0.  0.  7. 14.  0.  INPU0370              *COR
      *  0.  0.  0.  0.  4.  8. 14.  0.  0.  0.  0. 13.  0.  0.  0.  0.  INPU0371              *COR
      *  0.  0. 13.  8.  0.  0.  0.  0.  0.  5.  0.  0.  0.  0.  0.  0/  INPU0372              *COR
       DATA (JATX(I),I=2171,2330)/                                                             *COR
      *  5.  8.  0.  0.  0.  0.  0.  6.  5.  0.  0.  0.  0.  0.  4.  0.  INPU0374              *COR
      *  0.  0.  0.  0.  0.  4.  8.  0.  0.  0.  0.  0.  4.  4.  0.  0.  INPU0375              *COR
      *  0.  0.  0.  4.  7.  0.  0.  0.  0.  0.  1. 17.  3.  0.  0.  0.  INPU0376              *COR
      *  0.  9.  3.  0.  0.  0.  0.  0.  1.  3.  8.  0.  0.  0.  0.  3.  INPU0377              *COR
      *  5.  0.  0.  0.  0.  0.  5. 14.  0.  0.  0.  0.  0. 14.  0.  0.  INPU0378              *COR
      *  0.  0.  0.  0.  5.  3.  8.  0.  0.  0.  0.  4. 17.  0.  0.  0.  INPU0379              *COR
      *  0.  0.  4.  4.  0.  0.  0.  0.  0.  3.  8. 14.  0.  0.  0.  0.  INPU0380              *COR
      * 13.  4.  8.  0.  0.  0.  0.  5.  3.  8.  0.  0.  0.  0.  5.  3.  INPU0381              *COR
      *  8.  0.  0.  0.  0.  5.  3.  8.  0.  0.  0.  0.  5.  1.  8.  0.  INPU0382              *COR
      *  0.  0.  0.  0.  3.  8.  0.  0.  0.  0.  4.  9.  3.  0.  0.  0/  INPU0383              *COR
       DATA (JATX(I),I=2331,2415)/                                                             *COR
      *  0.  4.  4.  3.  0.  0.  0.  0. 13.  8. 14.  0.  0.  0.  0.  5.  INPU0385              *COR
      *  4.  8.  0.  0.  0.  0.  5.  3.  8.  0.  0.  0.  0.  5.  1.  0.  INPU0386              *COR
      *  0.  0.  0.  0.  1.  3.  0.  0.  0.  0.  0.  5.  1.  8.  0.  0.  INPU0387              *COR
      *  0.  0.  5.  1.  8.  0.  0.  0.  0.  0.  5.  1.  0.  0.  0.  0.  INPU0388              *COR
      *  5.  1.  3.  0.  0.  0.  0. 13.  1.  3.  0.  0.  0.  0.  3.  8.  INPU0389              *COR
      * 14.  0.  0.  0.  0/                                                                   INPU0390              *COR
       DATA (SORCX(I),I=1,120)/                                                                *COR
     *2HJA,4HBAE ,4HTAPE,4H 7/7,4H1  3,4H761 ,4H    ,4H    ,                                  INPU0392              *COR
     *2HJA,4HBAE ,4HTAPE,4H 7/7,4H1  3,4H761 ,4H    ,4H    ,                                  INPU0393              *COR
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397.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  3,4H/61 ,4H    ,4H    ,      INPU0394      *COR
398.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  3,4H/61 ,4H    ,4H    ,      INPU0395      *COR
399.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  3,4H/61 ,4H    ,4H    ,      INPU0396      *COR
400.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  3,4H/61 ,4H    ,4H    ,      INPU0397      *COR
401.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  9,4H/64 ,4H    ,4H    ,      INPU0398      *COR
402.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/68 ,4H    ,4H    ,      INPU0399      *COR
403.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  3,4H/61 ,4H    ,4H    ,      INPU0400      *COR
404.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/69 ,4H    ,4H    ,      INPU0401      *COR
405.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/69 ,4H    ,4H    ,      INPU0402      *COR
406.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/69 ,4H    ,4H    ,      INPU0403      *COR
407.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/69 ,4H    ,4H    ,                    *COR
408.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/65 ,4H    ,4H    ,      INPU0404      *COR
409.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  6,4H/63 ,4H    ,4H    ,      INPU0405      *COR
410.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  6,4H/70 ,4H    ,4H    /      INPU0410      *COR
411.     DATA (SORCX(I),I=129,260)/                                               *COR
412.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  9,4H/64 ,4H    ,4H    ,      INPU0412      *COR
413.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  9,4H/64 ,4H    ,4H    ,      INPU0413      *COR
414.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  9,4H/64 ,4H    ,4H    ,      INPU0414      *COR
415.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  9,4H/64 ,4H    ,4H    ,      INPU0415      *COR
416.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  9,4H/64 ,4H    ,4H    ,      INPU0416      *COR
417.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  6,4H/70 ,4H    ,4H    ,      INPU0417      *COR
418.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  6,4H/69 ,4H    ,4H    ,      INPU0418      *COR
419.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  3,4H/64 ,4H    ,4H    ,      INPU0419      *COR
420.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  9,4H/64 ,4H    ,4H    ,      INPU0420      *COR
421.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  6,4H/70 ,4H    ,4H    ,      INPU0421      *COR
422.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  6,4H/63 ,4H    ,4H    ,      INPU0422      *COR
423.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  3,4H/64 ,4H    ,4H    ,      INPU0423      *COR
424.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/68 ,4H    ,4H    ,      INPU0424      *COR
425.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  3,4H/67 ,4H    ,4H    ,      INPU0425      *COR
426.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  6,4H/70 ,4H    ,4H    ,      INPU0426      *COR
427.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  6,4H/70 ,4H    ,4H    ,      INPU0427      *COR
428.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  9,4H/65 ,4H    ,4H    ,      INPU0428      *COR
429.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  9,4H/65 ,4H    ,4H    ,      INPU0429      *COR
430.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    /      INPU0430      *COR
431.     DATA (SORCX(I),I=261,432)/                                               *COR
432.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    ,      INPU0432      *COR
433.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    ,      INPU0433      *COR
434.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    ,      INPU0434      *COR
435.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  3,4H/65 ,4H    ,4H    ,      INPU0435      *COR
436.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    ,      INPU0436      *COR
437.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/68 ,4H    ,4H    ,      INPU0437      *COR
438.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    ,      INPU0438      *COR
439.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    ,      INPU0439      *COR
440.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  3,4H/65 ,4H    ,4H    ,      INPU0440      *COR
441.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    ,      INPU0441      *COR
442.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  6,4H/69 ,4H    ,4H    ,      INPU0442      *COR
443.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    ,      INPU0443      *COR
444.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    ,      INPU0444      *COR
445.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    ,      INPU0445      *COR
446.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/68 ,4H    ,4H    ,      INPU0446      *COR
447.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    ,      INPU0447      *COR
448.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    ,      INPU0448      *COR
449.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    ,      INPU0449      *COR
450.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  6,4H/66 ,4H    ,4H    /      INPU0450      *COR
451.     DATA (SORCX(I),I=433,584)/                                               *COR
452.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1  6,4H/68 ,4H    ,4H    ,      INPU0452      *COR
453.    *2HJA,4H  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    ,      INPU0453      *COR
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454.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H   ,      INPUn454                *COR
455.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H   ,      INPUn455                *COR
456.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H   ,      INPUn456                *COR
457.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H   ,      INPUn457                *COR
458.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/65 ,4H    ,4H   ,      INPUn458                *COR
459.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/65 ,4H    ,4H   ,      INPUn459                *COR
460.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H   ,      INPUn460                *COR
461.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/65 ,4H    ,4H   ,      INPUn461                *COR
462.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/65 ,4H    ,4H   ,      INPUn462                *COR
463.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H   ,      INPUn463                *COR
464.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/61 ,4H    ,4H   ,      INPUn464                *COR
465.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/63 ,4H    ,4H   ,      INPUn465                *COR
466.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/66 ,4H    ,4H   ,      INPUn466                *COR
467.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/65 ,4H    ,4H   ,      INPUn467                *COR
468.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/65 ,4H    ,4H   ,      INPUn468                *COR
469.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/63 ,4H    ,4H   ,      INPUn469                *COR
470.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/70 ,4H    ,4H   /      INPUn470                *COR
471.       DATA (SORX(I),I=585,736)/                                                            *COR
472.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/63 ,4H    ,4H   ,      INPUn472                *COR
473.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/63 ,4H    ,4H   ,      INPUn473                *COR
474.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/60 ,4H    ,4H   ,      INPUn474                *COR
475.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/67 ,4H    ,4H   ,      INPUn475                *COR
476.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/63 ,4H    ,4H   ,      INPUn476                *COR
477.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/65 ,4H    ,4H   ,      INPUn477                *COR
478.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/63 ,4H    ,4H   ,      INPUn478                *COR
479.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/63 ,4H    ,4H   ,      INPUn479                *COR
480.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/63 ,4H    ,4H   ,      INPUn480                *COR
481.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/63 ,4H    ,4H   ,      INPUn481                *COR
482.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/63 ,4H    ,4H   ,      INPUn482                *COR
483.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/60 ,4H    ,4H   ,      INPUn483                *COR
484.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/61 ,4H    ,4H   ,      INPUn484                *COR
485.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/69 ,4H    ,4H   ,      INPUn485                *COR
486.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/66 ,4H    ,4H   ,      INPUn486                *COR
487.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/61 ,4H    ,4H   ,      INPUn487                *COR
488.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/70 ,4H    ,4H   ,      INPUn488                *COR
489.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/69 ,4H    ,4H   ,      INPUn489                *COR
490.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/70 ,4H    ,4H   /      INPUn490                *COR
491.       DATA (SORY(I),I=737,888)/                                                            *COR
492.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/69 ,4H    ,4H   ,      INPUn492                *COR
493.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/70 ,4H    ,4H   ,      INPUn493                *COR
494.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/69 ,4H    ,4H   ,      INPUn494                *COR
495.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/69 ,4H    ,4H   ,      INPUn495                *COR
496.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/69 ,4H    ,4H   ,      INPUn496                *COR
497.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/67 ,4H    ,4H   ,      INPUn497                *COR
498.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/70 ,4H    ,4H   ,      INPUn498                *COR
499.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/70 ,4H    ,4H   ,      INPUn499                *COR
500.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/68 ,4H    ,4H   ,      INPUn500                *COR
501.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/61 ,4H    ,4H   ,      INPUn501                *COR
502.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/69 ,4H    ,4H   ,      INPUn502                *COR
503.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/69 ,4H    ,4H   ,      INPUn503                *COR
504.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/70 ,4H    ,4H   ,      INPUn504                *COR
505.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/70 ,4H    ,4H   ,      INPUn505                *COR
506.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/69 ,4H    ,4H   ,      INPUn506                *COR
507.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/70 ,4H    ,4H   ,      INPUn507                *COR
508.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/68 ,4H    ,4H   ,      INPUn508                *COR
509.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/69 ,4H    ,4H   ,      INPUn509                *COR
510.      *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/61 ,4H    ,4H   /      INPUn510                *COR
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      DATA (SORCX(I),I=889,1040)/                                                  *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  6,4H/69 ,4H    ,4H    ,      INPU0512       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  9,4H/64 ,4H    ,4H    ,      INPU0513       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/60 ,4H    ,4H    ,      INPU0514       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/63 ,4H    ,4H    ,      INPU0515       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/60 ,4H    ,4H    ,      INPU0516       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  3,4H/61 ,4H    ,4H    ,      INPU0517       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  6,4H/69 ,4H    ,4H    ,      INPU0518       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/67 ,4H    ,4H    ,      INPU0519       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  6,4H/69 ,4H    ,4H    ,      INPU0520       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  9,4H/65 ,4H    ,4H    ,      INPU0521       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  9,4H/65 ,4H    ,4H    ,      INPU0522       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  3,4H/61 ,4H    ,4H    ,      INPU0523       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  6,4H/68 ,4H    ,4H    ,      INPU0524       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/60 ,4H    ,4H    ,      INPU0525       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  3,4H/61 ,4H    ,4H    ,      INPU0526       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  3,4H/61 ,4H    ,4H    ,      INPU0527       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  9,4H/65 ,4H    ,4H    ,      INPU0528       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/60 ,4H    ,4H    ,      INPU0529       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  3,4H/61 ,4H    ,4H    /      INPU0530       *COR
      DATA (SORCX(I),I=1041,1192)/                                                 *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  9,4H/65 ,4H    ,4H    ,      INPU0532       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/60 ,4H    ,4H    ,      INPU0533       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  6,4H/61 ,4H    ,4H    ,      INPU0534       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/60 ,4H    ,4H    ,      INPU0535       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  6,4H/62 ,4H    ,4H    ,      INPU0536       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/60 ,4H    ,4H    ,      INPU0537       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/65 ,4H    ,4H    ,      INPU0538       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  6,4H/61 ,4H    ,4H    ,      INPU0539       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  3,4H/61 ,4H    ,4H    ,      INPU0540       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  9,4H/67 ,4H    ,4H    ,      INPU0541       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/60 ,4H    ,4H    ,      INPU0542       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  6,4H/62 ,4H    ,4H    ,      INPU0543       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/65 ,4H    ,4H    ,      INPU0544       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/70 ,4H    ,4H    ,      INPU0545       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/60 ,4H    ,4H    ,      INPU0546       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/60 ,4H    ,4H    ,      INPU0547       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  6,4H/62 ,4H    ,4H    ,      INPU0548       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/70 ,4H    ,4H    ,      INPU0549       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  9,4H/65 ,4H    ,4H    /      INPU0550       *COR
      DATA (SORCX(I),I=1193,1344)/                                                 *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  9,4H/65 ,4H    ,4H    ,      INPU0552       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/60 ,4H    ,4H    ,      INPU0553       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/68 ,4H    ,4H    ,      INPU0554       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  9,4H/65 ,4H    ,4H    ,      INPU0555       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  6,4H/65 ,4H    ,4H    ,      INPU0556       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  6,4H/61 ,4H    ,4H    ,      INPU0557       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  9,4H/63 ,4H    ,4H    ,      INPU0558       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/66 ,4H    ,4H    ,      INPU0559       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/69 ,4H    ,4H    ,      INPU0560       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/60 ,4H    ,4H    ,      INPU0561       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/68 ,4H    ,4H    ,      INPU0562       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/69 ,4H    ,4H    ,      INPU0563       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/68 ,4H    ,4H    ,      INPU0564       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/60 ,4H    ,4H    ,      INPU0565       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1 12,4H/68 ,4H    ,4H    ,      INPU0566       *COR
     *2HJA,4HNAF ,4HTAPE,4H 7/7,4H1  6,4H/69 ,4H    ,4H    ,      INPU0567       *COR
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568.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/65 ,4H    ,4H    ,          INPU0568                *COR
569.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/67 ,4H    ,4H    ,          INPU0569                *COR
570.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/66 ,4H    ,4H    /          INPU0570                *COR
571.         DATA (SORCX(I),I=1345,1496)/                                                             *COR
572.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/65 ,4H    ,4H    ,          INPU0572                *COR
573.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/70 ,4H    ,4H    ,          INPU0573                *COR
574.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/69 ,4H    ,4H    ,          INPU0574                *COR
575.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/66 ,4H    ,4H    ,          INPU0575                *COR
576.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/65 ,4H    ,4H    ,          INPU0576                *COR
577.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/60 ,4H    ,4H    ,          INPU0577                *COR
578.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/65 ,4H    ,4H    ,          INPU0578                *COR
579.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/65 ,4H    ,4H    ,          INPU0579                *COR
580.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/60 ,4H    ,4H    ,          INPU0580                *COR
581.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/62 ,4H    ,4H    ,          INPU0581                *COR
582.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/66 ,4H    ,4H    ,          INPU0582                *COR
583.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/64 ,4H    ,4H    ,          INPU0583                *COR
584.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/62 ,4H    ,4H    ,          INPU0584                *COR
585.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/64 ,4H    ,4H    ,          INPU0585                *COR
586.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/61 ,4H    ,4H    ,          INPU0586                *COR
587.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/63 ,4H    ,4H    ,          INPU0587                *COR
588.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/64 ,4H    ,4H    ,          INPU0586                *COR
589.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/67 ,4H    ,4H    ,          INPU0589                *COR
590.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    /          INPU0590                *COR
591.         DATA (SORCX(I),I=1497,1648)/                                                             *COR
592.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    ,          INPU0592                *COR
593.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/64 ,4H    ,4H    ,          INPU0593                *COR
594.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    ,          INPU0594                *COR
595.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/62 ,4H    ,4H    ,          INPU0595                *COR
596.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/67 ,4H    ,4H    ,          INPU0596                *COR
597.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/67 ,4H    ,4H    ,          INPU0597                *COR
598.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/61 ,4H    ,4H    ,          INPU0598                *COR
599.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/67 ,4H    ,4H    ,          INPU0599                *COR
600.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/67 ,4H    ,4H    ,          INPU0600                *COR
601.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/67 ,4H    ,4H    ,          INPU0601                *COR
602.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/70 ,4H    ,4H    ,          INPU0602                *COR
603.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/65 ,4H    ,4H    ,          INPU0603                *COR
604.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/66 ,4H    ,4H    ,          INPU0604                *COR
605.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/65 ,4H    ,4H    ,          INPU0605                *COR
606.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/65 ,4H    ,4H    ,          INPU0606                *COR
607.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/69 ,4H    ,4H    ,          INPU0607                *COR
608.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/65 ,4H    ,4H    ,          INPU0608                *COR
609.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/65 ,4H    ,4H    ,          INPU0609                *COR
610.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/70 ,4H    ,4H    /          INPU0610                *COR
611.         DATA (SORCX(I),I=1649,1800)/                                                             *COR
612.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/63 ,4H    ,4H    ,          INPU0612                *COR
613.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/65 ,4H    ,4H    ,          INPU0613                *COR
614.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/65 ,4H    ,4H    ,          INPU0614                *COR
615.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/62 ,4H    ,4H    ,          INPU0615                *COR
616.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/65 ,4H    ,4H    ,          INPU0616                *COR
617.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/64 ,4H    ,4H    ,          INPU0617                *COR
618.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/65 ,4H    ,4H    ,          INPU0618                *COR
619.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/65 ,4H    ,4H    ,          INPU0619                *COR
620.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/65 ,4H    ,4H    ,          INPU0620                *COR
621.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/63 ,4H    ,4H    ,          INPU0621                *COR
622.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/63 ,4H    ,4H    ,          INPU0622                *COR
623.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/60 ,4H    ,4H    ,          INPU0623                *COR
624.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/63 ,4H    ,4H    ,          INPU0624                *COR
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625.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/63 ,4H    ,4H    ,        INPUn625                *COR
626.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/63 ,4H    ,4H    ,        INPUn626                *COR
627.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/63 ,4H    ,4H    ,        INPUn627                *COR
628.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/63 ,4H    ,4H    ,        INPUn628                *COR
629.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/63 ,4H    ,4H    ,        INPUn629                *COR
630.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/70 ,4H    ,4H    /        INPUn630                *COR
631.         DATA (SORCX(I),I=1801,1952)/                                                          *COR
632.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/67 ,4H    ,4H    ,        INPUn632                *COR
633.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/64 ,4H    ,4H    ,        INPUn633                *COR
634.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/64 ,4H    ,4H    ,        INPUn634                *COR
635.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/64 ,4H    ,4H    ,        INPUn635                *COR
636.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    ,        INPUn636                *COR
637.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    ,        INPUn637                *COR
638.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/69 ,4H    ,4H    ,        INPUn638                *COR
639.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/68 ,4H    ,4H    ,        INPUn639                *COR
640.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/70 ,4H    ,4H    ,        INPUn640                *COR
641.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/65 ,4H    ,4H    ,        INPUn641                *COR
642.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/65 ,4H    ,4H    ,        INPUn642                *COR
643.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/65 ,4H    ,4H    ,        INPUn643                *COR
644.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/66 ,4H    ,4H    ,        INPUn644                *COR
645.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/66 ,4H    ,4H    ,        INPUn645                *COR
646.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/66 ,4H    ,4H    ,        INPUn646                *COR
647.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/66 ,4H    ,4H    ,        INPUn647                *COR
648.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/66 ,4H    ,4H    ,        INPUn648                *COR
649.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/66 ,4H    ,4H    ,        INPUn649                *COR
650.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/66 ,4H    ,4H    /        INPUn650                *COR
651.         DATA (SORCX(I),I=1953,2104)/                                                          *COR
652.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/70 ,4H    ,4H    ,        INPUn652                *COR
653.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/66 ,4H    ,4H    ,        INPUn653                *COR
654.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/66 ,4H    ,4H    ,        INPUn654                *COR
655.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/66 ,4H    ,4H    ,        INPUn655                *COR
656.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/66 ,4H    ,4H    ,        INPUn656                *COR
657.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/66 ,4H    ,4H    ,        INPUn657                *COR
658.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/66 ,4H    ,4H    ,        INPUn658                *COR
659.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/67 ,4H    ,4H    ,        INPUn659                *COR
660.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/67 ,4H    ,4H    ,        INPUn660                *COR
661.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/67 ,4H    ,4H    ,        INPUn661                *COR
662.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/67 ,4H    ,4H    ,        INPUn662                *COR
663.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  3,4H/67 ,4H    ,4H    ,        INPUn663                *COR
664.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/67 ,4H    ,4H    ,        INPUn664                *COR
665.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  9,4H/67 ,4H    ,4H    ,        INPUn665                *COR
666.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/67 ,4H    ,4H    ,        INPUn666                *COR
667.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/68 ,4H    ,4H    ,        INPUn667                *COR
668.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/68 ,4H    ,4H    ,        INPUn668                *COR
669.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/68 ,4H    ,4H    ,        INPUn669                *COR
670.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/69 ,4H    ,4H    /        INPUn670                *COR
671.         DATA (SORCX(I),I=2105,2216)/                                                          *COR
672.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/69 ,4H    ,4H    ,        INPUn672                *COR
673.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/69 ,4H    ,4H    ,        INPUn673                *COR
674.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/69 ,4H    ,4H    ,        INPUn674                *COR
675.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/70 ,4H    ,4H    ,        INPUn675                *COR
676.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1  6,4H/70 ,4H    ,4H    ,        INPUn676                *COR
677.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/60 ,4H    ,4H    ,        INPUn677                *COR
678.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 **,4H/60 ,4H    ,4H    ,        INPUn678                *COR
679.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 **,4H/61 ,4H    ,4H    ,        INPUn679                *COR
680.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 **,4H/61 ,4H    ,4H    ,        INPUn680                *COR
681.        *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/70 ,4H    ,4H    ,        INPUn681                *COR
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682.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/70 ,4H    ,4H    ,      INPUn682                *COR
683.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/** ,4H    ,4H    ,      INPUn683                *COR
684.          *2HCO,4HNVAT,4HR 2P,4HH-12,4H2 12,4H/61 ,4H    ,4H    ,      INPUn684                *COR
685.          *2HDU,4HFF R,4HAUER,4H 6/6,4H1   ,4H    ,4H    /                                     *COR
686.           DATA (SORCX(I),I=2217,2328)/                                                        *COR
687.          *2HDU,4HFF R,4HAUER,4H 6/6,4H1   ,4H    ,4H    ,                                     *COR
688.          *2HDU,4HFF R,4HAUER,4H 6/6,4H1   ,4H    ,4H    ,                                     *COR
689.          *2HDU,4HFF R,4HAUER,4H 6/6,4H1   ,4H    ,4H    ,                                     *COR
690.          *2HDU,4HFF R,4HAUER,4H 6/6,4H1   ,4H    ,4H    ,                                     *COR
691.          *2HDU,4HFF R,4HAUER,4H 6/6,4H1   ,4H    ,4H    ,                                     *COR
692.          *2HDU,4HFF R,4HAUER,4H 6/6,4H1   ,4H    ,4H    ,                                     *COR
693.          *2HDU,4HFF R,4HAUER,4H 6/6,4H1   ,4H    ,4H    ,                                     *COR
694.          *2HDU,4HFF R,4HAUER,4H 6/6,4H1   ,4H    ,4H    ,                                     *COR
695.          *2H  ,4H     ,4H    ,4H     ,4H    ,4H    ,4H    ,      INPUn685                *COR
696.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 9,4H/63 ,4H    ,4H    ,      INPUn686                *COR
697.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 6,4H/70 ,4H    ,4H    ,      INPUn687                *COR
698.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 3,4H/64 ,4H    ,4H    ,      INPUn688                *COR
699.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 3,4H/65 ,4H    ,4H    ,      INPUn689                *COR
700.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 3,4H/67 ,4H    ,4H    /      INPUn690                *COR
701.           DATA (SORCX(I),I=2329,2480)/                                                        *COR
702.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/60 ,4H    ,4H    ,      INPUn692                *COR
703.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 9,4H/65 ,4H    ,4H    ,      INPUn693                *COR
704.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/62 ,4H    ,4H    ,      INPUn694                *COR
705.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 0,4H/64 ,4H    ,4H    ,      INPUn695                *COR
706.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/66 ,4H    ,4H    ,      INPUn696                *COR
707.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 0,4H/70 ,4H    ,4H    ,      INPUn697                *COR
708.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 6,4H/70 ,4H    ,4H    ,      INPUn698                *COR
709.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 9,4H/61 ,4H    ,4H    ,      INPUn699                *COR
710.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/62 ,4H    ,4H    ,      INPUn700                *COR
711.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 9,4H/67 ,4H    ,4H    ,      INPUn701                *COR
712.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 9,4H/65 ,4H    ,4H    ,      INPUn702                *COR
713.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 6,4H/66 ,4H    ,4H    ,      INPUn703                *COR
714.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 0,4H/62 ,4H    ,4H    ,      INPUn704                *COR
715.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 9,4H/66 ,4H    ,4H    ,      INPUn705                *COR
716.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 3,4H/67 ,4H    ,4H    ,      INPUn706                *COR
717.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 6,4H/65 ,4H    ,4H    ,      INPUn707                *COR
718.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 6,4H/67 ,4H    ,4H    ,      INPUn708                *COR
719.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 3,4H/64 ,4H    ,4H    ,      INPUn709                *COR
720.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    /      INPUn710                *COR
721.           DATA (SORCX(I),I=2481,2632)/                                                        *COR
722.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    ,      INPUn712                *COR
723.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/65 ,4H    ,4H    ,      INPUn713                *COR
724.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 9,4H/61 ,4H    ,4H    ,      INPUn714                *COR
725.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 9,4H/63 ,4H    ,4H    ,      INPUn715                *COR
726.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 6,4H/63 ,4H    ,4H    ,      INPUn716                *COR
727.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 3,4H/67 ,4H    ,4H    ,      INPUn717                *COR
728.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 6,4H/62 ,4H    ,4H    ,      INPUn718                *COR
729.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/69 ,4H    ,4H    ,      INPUn719                *COR
730.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 3,4H/66 ,4H    ,4H    ,      INPUn720                *COR
731.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 3,4H/64 ,4H    ,4H    ,      INPUn721                *COR
732.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 6,4H/67 ,4H    ,4H    ,      INPUn722                *COR
733.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 3,4H/67 ,4H    ,4H    ,      INPUn723                *COR
734.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    ,      INPUn724                *COR
735.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 6,4H/65 ,4H    ,4H    ,      INPUn725                *COR
736.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 6,4H/70 ,4H    ,4H    ,      INPUn726                *COR
737.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 6,4H/67 ,4H    ,4H    ,      INPUn727                *COR
738.          *2HJA,4HNAE  ,4HTAPE,4H 7/7,4H1 9,4H/64 ,4H    ,4H    ,      INPUn728                *COR
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      *2HJA,4HBAE ,4HTAPE,4H 7/7,4H1  6,4H/65 ,4H    ,4H    ,              INPU0729
      *2HJA,4HBAE ,4HTAPE,4H 7/7,4H1  3,4H/65 ,4H    ,4H    /              INPU0730
       DATA (SORCX(I),I=2633,2760)/
      *2HJA,4HBAE ,4HTAPE,4H 7/7,4H1  3,4H/65 ,4H    ,4H    ,              INPU0732
      *2HJA,4HBAE ,4HTAPE,4H 7/7,4H1  3,4H/66 ,4H    ,4H    ,              INPU0733
      *2HJA,4HBAE ,4HTAPE,4H 7/7,4H1  3,4H/66 ,4H    ,4H    ,              INPU0734
      *2HJA,4HBAE ,4HTAPE,4H 7/7,4H1  6,4H/66 ,4H    ,4H    ,              INPU0735
      *2HJA,4HBAE ,4HTAPE,4H 7/7,4H1  6,4H/66 ,4H    ,4H    ,              INPU0736
      *2HJA,4HBAE ,4HTAPE,4H 7/7,4H1  9,4H/67 ,4H    ,4H    ,              INPU0737
      *2HJA,4HBAE ,4HTAPE,4H 7/7,4H1  9,4H/66 ,4H    ,4H    ,              INPU0738
      *2HJA,4HBAE ,4HTAPE,4H 7/7,4H1  3,4H/65 ,4H    ,4H    ,              INPU0739
      *2HJA,4HBAE ,4HTAPE,4H 7/7,4H1  0,4H/64 ,4H    ,4H    ,              INPU0740
      *2HJA,4HBAE ,4HTAPE,4H 7/7,4H1  9,4H/67 ,4H    ,4H    ,              INPU0741
      *2HJA,4HBAE ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    ,              INPU0742
      *2HJA,4HBAE ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    ,              INPU0743
      *2HJA,4HBAE ,4HTAPE,4H 7/7,4H1  3,4H/65 ,4H    ,4H    ,              INPU0744
      *2HJA,4HBAE ,4HTAPE,4H 7/7,4H1 12,4H/64 ,4H    ,4H    ,              INPU0745
      *2HJA,4HBAE ,4HTAPE,4H 7/7,4H1  3,4H/64 ,4H    ,4H    ,              INPU0746
      *2HJA,4HBAE ,4HTAPE,4H 7/7,4H1  6,4H/67 ,4H    ,4H    /              INPU0747
       DATA (AMOA3(I),I=1,163)/
      *4HC02 ,4HC2  ,4HH20 ,4HCL  ,4HC*  ,4HC2H2,4HCLH ,4HEH  ,4HC  ,
      *4HC2  ,4HC3  ,4HC4  ,4HC5  ,4HAL  ,4HCAL ,
      *4HALCL,4HALCL,4HALCL,4HALCL,4HALCL,4HALCL,4HALCL,4HALF ,4HALF0,   INPU0751
      *4HALF2,4HALF3,4HALH ,4HALH0,4HALH0,4HALN ,4HALO ,4HAL2C,4HAL20,   INPU0752
      *4HAL20,4HC   ,4HBCL ,4HBCLF,4HBCLF,4HBCL0,4HBCL2,4HBCL2,4HBCL3,   INPU0753
      *4HBE  ,4HBE0 ,4HBE2 ,4HBE3 ,4HBH  ,4HBH0 ,4HBH02,4HBH2 ,4HBH20,   INPU0754
      *4HBH3 ,4HBH30,4HBO  ,4HBO  ,4HB2  ,4HF2CL,4HB2H6,4HB202,4HB203,   INPU0755
      *4HF3CL,4HB3F3,4HB3H3,4HB3H6,4HB5H9,4HB10H,4HBE  ,4HC23F,4HBFCL,   INPU0756
      *4HBFCL,4HBFCL,4HBFF ,4HBFF2,4HBFH ,4HBFH0,4HBFH2,4HBFH2,4HBFO ,   INPU0757
      *4HBF2C,4HBF20,4HBF30,4HBF40,4HBF50,4HBFO0,4HCCL ,4HCCLF,4HCCLF,   INPU0758
      *4HCCLH,4HCCL2,4HCCL3,4HCCL4,4HCF  ,4HCF0 ,4HCF2 ,4HCF20,4HCF3 ,   INPU0759
      *4HCF4 ,4HCH  ,4HCHCL,4HCHCL,4HCHCL,4HCHFC,4HCHF3,4HCHN ,4HCHN0,   INPU0760
      *4HCH0 ,4HCH2 ,4HCH2C,4HCH2C,4HCH2F,4HCH20,4HCH3 ,4HCH3C,4HCH3C,   INPU0761
      *4HCH3F,4HCH3F,4HCH4 ,4HCN  ,4HC2F2,4HC2F4,4HC2H4,4HC2H4,4HC2N2,   INPU0762
      *4HC302,4HC4L2,4HC4N2,4HCL  ,4HCLF ,4HCLFL,4HCLFO,4HCLF3,4HCLF3,   INPU0763
      *4HCLHO,4HCLH2,4HCLLI,4HCLLI,4HCLNO,4HCLO ,4HCL02,4HCLSI,4HCL2H,   INPU0764
      *4HCL2I,4HCL20,4HCL2S,4HCL3F,4HCL3H,4HCL3I,4HCL4S,4HF   ,4HFH0 ,   INPU0765
      *4HFH2S,4HFLI ,4HFLIO,4HFO  ,4HFNO ,4HFNSI,4HFO  ,4HFSI ,4HF2H2,   INPU0766
      *4HF2LI,4HF20 ,4HF2SI,4HF3HS,4HF3LI,4HF5N ,4HH   ,4HHLI ,4HHLIO/   INPU0767
       DATA (AMOA8(I),I=169,265)/
      *4HHN  ,4HHO  ,4HHSI ,4HH2LI,4HH2N ,4HH202,4HH3N ,4HH4N2,4HH4SI,   INPU0769
      *4HI   ,4HITH ,4HLIO ,4HLI2 ,4HLI20,4HN   ,4HNO  ,4HNO2 ,4HNSI ,   INPU0770
      *4HN20 ,4HN2O3,4HN3O4,4HN4O5,4HO   ,4HOSI ,4HO2SI,4HO3  ,4HSI  ,   INPU0771
      *4HSI2 ,4HSI3 ,4HCCL2,4HBF2H,4HBF20,4HCCLO,4HCFO ,4HC2F6,4HFNO2,   INPU0772
      *4HCLIO,4HCLF4,4HCL  ,4HBF2H,4HH2HE,4HCFF3,4HCLNO,4HF2N ,4HF3FH,   INPU0773
      *4HH3F2,4HC2H3,4HFNO3,4HHNO ,4HNO2 ,4HFFN ,4HHNO2,4HHO2 ,4HNO3,   INPU0774
      *4HHF20,4HF2CS,4HF3SI,4HALHO,4HF4H2,4HHO2 ,4HLI2O,4HH2F4,4HNO3 ,   INPU0775
      *4HCF4O,4HCCL2,4HCCL3,4HF2N2,4HF2H2,4HH2N2,4HCLO2,4HS244,4HALHO,   INPU0776
      *4HCFFO,4HC2O ,4HCF2F,4HCN2 ,4HCN2 ,4HC2O ,4HCLF5,4HFFH ,4HF02 ,   INPU0777
      *4HLI2O,4HC2H ,4HCSI ,4HCSI2,4HC2N ,4HC2SI,4HNSI2,4HC2CL,4HC2CL,   INPU0778
      *4HC2HF,4HCL02,4HCOCL,4HC2HC,4HCHCL,4HCHF ,4HC2F3,4HCL3S,4HCL2F,   INPU0779
      *4HF3NO,4HF2  ,4HCL2 ,4HN2  ,4HO2  ,4HCNO ,4HN3  ,4HF2F4,4HA   ,   INPU0780
      *4HC2N2,4HC2F6,4HC3H ,4HC3H2,4HC3H3,4HC3H4,4HC3H5,4HC4H ,4HC4H2/
       DATA (AMOA8(I),I=286,345)/
      *4HHF  ,4HI2O,4HALF6,4HALCL,4HF3H3,4HCSI*,4HC2LI,4HCLH4,4HCLH4,   INPU0781
      *4HCLLI,4HFFH2,4HALCL,4HALF3,4HALLI,4HALN*,4H&L20,4HC33L,4HRN* ,   INPU0782
      *4HLI* ,4HLI3N,4HN4SI,4HBF20,4HAL* ,4HAL20,4HP*  ,4HP203,4HCP4*,   INPU0783
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      *4HBE* ,4HBEC*,4HCBE2,4HBE3*,4HCLLI,4HELI*,4HHLTO,4HLI20,4H02SI,   INPU0784  *COR
      *4HSI* ,4HBLTO,4HBECL,4HBEE2,4HLI20,4HAL25,4HR4LI,4HR6LI,4HRALI,   INPU0785  *COR
      *4HP2H4,4HCLI2,4HBEE3,4HBEE4,4HAL60,4HP2BE,4HR3E3,4HR10H,4HELI*,   INPU0786  *COR
      *4HEH02,4HEH30,4HE5H9,4HRH4L,4HALH4,4HI I20/                       INPU0787  *COR
       DATA (AMORD(I),I=1,160)/                                                    *COR
      *4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,   INPU0789  *COR
      *4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,      ,      ,      ,          *COR
      *4H    ,4HE   ,4HE2  ,4H0   ,4H2   ,4H2E  ,4H3   ,4H    ,4H    ,   INPU0791  *COR
      *4H    ,4H    ,4H    ,4H    ,4E2   ,4H    ,4H    ,4HL6  ,4H    ,   INPU0792  *COR
      *4H2   ,4H    ,4H    ,4H    ,4H2   ,4H    ,4H    ,4HE   ,4H    ,   INPU0793  *COR
      *4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,4H2   ,   INPU0794  *COR
      *4H    ,4H3   ,4H    ,4H    ,4H    ,4H4   ,4H    ,4H    ,4H    ,   INPU0795  *COR
      *4H3H3 ,4H07  ,4H0E  ,4H63  ,4H    ,4H14  ,4H    ,4H    ,4H    ,   INPU0796  *COR
      *4HE   ,4H2   ,4H    ,4H    ,4H    ,4H    ,4H    ,4HC2  ,4H    ,   INPU0797  *COR
      *4HL4  ,4H2   ,4E3   ,4H4   ,4H5   ,4H6   ,4H    ,4H0   ,4H3   ,   INPU0798  *COR
      *4H    ,4HC   ,4HE   ,4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,   INPU0799  *COR
      *4H    ,4H    ,4HE2  ,4H2E  ,4H3   ,4H    ,4H    ,4H    ,4H    ,   INPU0800  *COR
      *4H    ,4H    ,4HLF  ,4HL2  ,4H2   ,4H    ,4H    ,4HL   ,4HL3S  ,   INPU0801  *COR
      *4H    ,4H2ST ,4H    ,4H    ,4H    ,4H    ,4H    ,4H0   ,4H    ,   INPU0802  *COR
      *4H    ,4HSI  ,4H    ,4H    ,4H    ,4HT2  ,4H3   ,4H    ,4HSI  ,   INPU0803  *COR
      *4H    ,4HST  ,4H    ,4H0   ,4H    ,4H    ,4H    ,4H    ,4H2SI ,   INPU0804  *COR
      *4HT2  ,4H    ,4H    ,4HSI  ,4HSI  ,4HT3  ,4HI   ,4H    ,4H    ,   INPU0805  *COR
      *4HT   ,4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,4HSI  ,   INPU0806  *COR
      *4H2   ,4H    ,4H    ,4HI   ,4H3   ,4H    ,4H    ,4H    ,4H    /   INPU0807  *COR
       DATA (AMORD(I),I=169,285)/                                                  *COR
      *4H    ,4H    ,4H    ,4H202 ,4H    ,4H    ,4H    ,4H    ,4H    ,   INPU0809  *COR
      *4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,   INPU0810  *COR
      *4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,   INPU0811  *COR
      *4H    ,4H    ,4HE2  ,4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,   INPU0812  *COR
      *4H2   ,4HLT   ,4H    ,4H0   ,4H04  ,4HL1  ,4H2   ,4H    ,4H203 ,   INPU0813  *COR
      *4H4H07 ,4H03  ,4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,   INPU0814  *COR
      *4H    ,4HT   ,4H    ,4H    ,4H    ,4H    ,4H2   ,4H    ,4H    ,   INPU0815  *COR
      *4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,4HF   ,4H04  ,4H2   ,   INPU0816  *COR
      *4H2   ,4H    ,4H20  ,4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,   INPU0817  *COR
      *4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,4H4   ,4H6   ,   INPU0818  *COR
      *4H    ,4H    ,4H2   ,4HL   ,4H    ,4H    ,4HN   ,4HI   ,4H6   ,   INPU0819  *COR
      *4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,4H0   ,4H    ,   INPU0820  *COR
      *4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,4H    ,4H    /          *COR
       DATA (AMORD(I),I=286,345)/                                                  *COR
      *4H    ,4H2*  ,4HLT3*,4H0*  ,4H03* ,4H    ,4H2*  ,4HN*  ,4HN04*,   INPU0821  *COR
      *4H04* ,4H02* ,4H3*  ,4H*   ,4H02* ,4H    ,4H5ST*,4H4*  ,4H    ,   INPU0822  *COR
      *4H    ,4H*   ,4H3*  ,4H4SI*,4H    ,4H3*  ,4H    ,4H*   ,4H    ,   INPU0823  *COR
      *4H    ,4H    ,4H*   ,4H2*  ,4H*   ,4H    ,4H*   ,4H*   ,4H*   ,   INPU0824  *COR
      *4H    ,4H2*  ,4H2*  ,4H*   ,4H3SI*,4HE04*,4H207*,4H201*,4H201*,   INPU0825  *COR
      *4H04* ,4H03* ,4HLT* ,4HLI2*,4H13S*,4H3C6*,4H03* ,4H14* ,4H    ,   INPU0826  *COR
      *4H*   ,4H2*  ,4H*   ,4HI*  ,4HLI* ,4H5SI*/                       INPU0827  *COR
       DATA (RAX(I),I=1,108)/                                                      *COR
      *-9.4054E+4,-9.4054E+4,-9.9600E-1,-9.9600E-1,-5.7798E+4,-5.7798E+4,INPU0829  *COR
      *-2.6417E+4,-2.6417E+4, 0.0000E+0, 0.0000E+0, 5.4190E+4, 5.4190E+4,INPU0830  *COR
      *-2.2063E+4,-2.2063E+4,-6.5140E+4,-6.5140E+4, 1.7089E+5, 1.7089E+5,INPU0831  *COR
      * 2.0022E+5, 2.0022E+5, 1.9600E+5, 1.9600E+5, 2.3200E+5, 2.3200E+5,INPU0832  *COR
      * 2.3400E+5, 2.3400E+5, 7.8000E+4, 7.8000E+4, 1.6480E+5, 1.6480E+5,          *COR
      *-1.2300E+4,-1.2300E+4,-1.2000E+5,-1.2000E+5,-2.3760E+5,-2.3760E+5,INPU0835  *COR
      *-8.3200E+4,-8.3200E+4,-7.5000E+4,-7.5000E+4,-1.8860E+5,-1.8860E+5,INPU0836  *COR
      *-1.3970E+5,-1.3970E+5,-6.3400E+4,-6.3400E+4,-1.4020E+5,-1.4020E+5,INPU0837  *COR
      *-1.6500E+5,-1.6500E+5,-2.8903E+5,-2.8903E+5, 6.2000E+4, 6.2000E+4,INPU0838  *COR
      * 8.0000E+3, 8.0000E+3,-1.1000E+5,-1.1000E+5, 1.0400E+5, 1.0400E+5,INPU0839  *COR
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     * 2.0000E+4, 2.0000E+4,-3.0964E+5,-3.0964E+5,-3.1400E+4,-3.1400E+4,INPU0840  *COR
     *-9.7000E+4,-9.7000E+4, 1.3286E+5, 1.3280E+5, 3.3800E+4, 3.3800E+4,INPU0841  *COR
     *-7.5000E+4,-7.5000E+4,-2.1160E+5,-2.1160E+5,-7.5600E+4,-7.5600E+4,INPU0842  *COR
     *-2.0000E+4,-2.0000E+4,-1.5400E+5,-1.5400E+5,-9.6310E+4,-9.6310E+4,INPU0843  *COR
     *-2.7700E+4,-2.7700E+4,-1.4400E+5,-1.4400E+5,-1.3000E+5,-1.3000E+5,INPU0844  *COR
     *-2.7142E+5,-2.7142E+5, 1.0580E+5, 1.0580E+5,-2.0000E+4,-2.0000E+4,INPU0845  *COR
     *-1.3400E+5,-1.3400E+5, 4.8000E+4, 4.8000E+4,-1.1400E+5,-1.1400E+5,INPU0846  *COR
     * 2.5500E+4, 2.5500E+4,-2.3716E+5,-2.3716E+5, 1.1400E+5, 1.1400E+5/INPU0847  *COR
      DATA (RAX(I),I=109,222)/                                                    *COR
     * 1.1300E-1, 1.1300E-1, 1.9500E+5, 1.9500E+5,-1.1690E+5,-1.1690E+5,INPU0849  *COR
     * 9.8000E+3, 9.8000E+3,-1.0900E+5,-1.0900E+5,-1.9914E+5,-1.9914E+5,INPU0850  *COR
     *-3.9000E+5,-3.9000E+5,-5.6530E+5,-5.6530E+5,-5.4300E+5,-5.4300E+5,INPU0851  *COR
     *-1.2190E+5,-1.2190E+5, 1.7500E+4, 1.7500E+4, 1.1300E+4, 1.1300E+4,INPU0852  *COR
     * 7.8255E+4, 7.8255E+4, 1.3500E+5, 1.3500E+5, 1.4500E+4, 1.4500E+4,INPU0853  *COR
     *-1.3700E+5,-1.3700E+5,-8.6100E+4,-8.6100E+4,-4.9678E+4,-4.9678E+4,INPU0854  *COR
     *-1.9025E+5,-1.9025E+5, 7.6768E+4, 7.6768E+4,-2.5000E+4,-2.5000E+4,INPU0855  *COR
     * 3.0000E+4, 3.0000E+4,-1.5640E+5,-1.5640E+5, 3.1000E+4, 3.1000E+4,INPU0856  *COR
     *-1.7900E+5,-1.7900E+5,-9.8000E+4,-9.8000E+4,-2.5200E+5,-2.5200E+5,INPU0857  *COR
     *-3.8000E+5,-3.8000E+5,-5.0500E+5,-5.0500E+5,-6.3600E+5,-6.3600E+5,INPU0858  *COR
     * 1.2000E+5, 1.2000E+5,-1.0200E+5,-1.0200E+5,-1.6920E+5,-1.6920E+5,INPU0859  *COR
     * 3.2970E+4, 3.2970E+4,-5.2600E+4,-5.2600E+4,-6.9000E+4,-6.9000E+4,INPU0860  *COR
     *-2.2940E+4,-2.2940E+4, 6.1000E+4, 6.1000E+4, 8.6000E+3, 8.6000E+3,INPU0861  *COR
     *-4.3500E+4,-4.3500E+4,-1.5270E+5,-1.5270E+5,-1.1240E+5,-1.1240E+5,INPU0862  *COR
     *-2.2304E+5,-2.2304E+5, 1.4200E+5, 1.4200E+5,-1.1510E+5,-1.1510E+5,INPU0863  *COR
     *-6.7700E+4,-6.7700E+4,-2.4660E+4,-2.4660E+4,-9.0000E+4,-9.0000E+4,INPU0864  *COR
     *-1.6660E+5,-1.6660E+5, 3.2300E+4, 3.2300E+4,-2.4300E+4,-2.4300E+4,INPU0865  *COR
     * 1.0400E+4, 1.0400E+4, 9.2070E+4, 9.2070E+4,-6.2600E+4,-6.2600E+4,INPU0866  *COR
     *-2.2830E+4,-2.2830E+4,-1.0771E+5,-1.0771E+5,-2.7700E+4,-2.7700E+4/INPU0867  *COR
      DATA (RAX(I),I=223,336)/                                                    *COR
     * 3.4820E+4, 3.4820E+4,-2.0660E+4,-2.0660E+4,-1.2640E+5,-1.2640E+5,INPU0869  *COR
     *-5.6000E+4,-5.6000E+4,-2.9862E+5,-2.9862E+5,-1.7895E+4,-1.7895E+4,INPU0870  *COR
     * 1.0400E+5, 1.0400E+5, 5.0000E+3, 5.0000E+3,-1.5740E+5,-1.5740E+5,INPU0871  *COR
     * 1.2540E+4, 1.2540E+4,-1.2580E+4,-1.2580E+4, 7.3870E+4, 7.3870E+4,INPU0872  *COR
     *-2.2380E+4,-2.2380E+4,-6.8500E+4,-6.8500E+4, 1.2750E+5, 1.2750E+5,INPU0873  *COR
     * 2.8922E+4, 2.8922E+4,-1.2140E+4,-1.2140E+4,-1.8020E+5,-1.8020E+5,INPU0874  *COR
     *-5.1200E+3,-5.1200E+3,-3.7970E+4,-3.7970E+4,-3.1500E+5,-3.1500E+5,INPU0875  *COR
     *-2.2000E+4,-2.2000E+4,-4.8000E+4,-4.8000E+4,-4.6778E+4,-4.6778E+4,INPU0876  *COR
     *-3.4000E+3,-3.4000E+3, 1.2370E+4, 1.2370E+4, 2.4192E+4, 2.4192E+4,INPU0877  *COR
     * 2.5000E+4, 2.5000E+4, 4.5700E+4, 4.5700E+4,-7.5000E+4,-7.5000E+4,INPU0878  *COR
     *-1.4305E+5,-1.4305E+5, 2.1000E+4, 2.1000E+4,-4.0000E+4,-4.0000E+4,INPU0879  *COR
     *-2.0100E+5,-2.0100E+5,-1.1200E+5,-1.1200E+5,-2.4013E+5,-2.4013E+5,INPU0880  *COR
     *-1.5840E+5,-1.5840E+5, 1.8660E+4, 1.8660E+4,-3.1000E+4,-3.1000E+4,INPU0881  *COR
     *-1.0500E+5,-1.0500E+5,-8.1450E+4,-8.1450E+4,-2.2000E+4,-2.2000E+4,INPU0882  *COR
     * 5.9500E+4, 5.9500E+4,-1.5700E+4,-1.5700E+4,-3.8598E+5,-3.8598E+5,INPU0883  *COR
     * 2.6000E+4, 2.6000E+4,-4.6000E+3,-4.6000E+3,-1.9400E+5,-1.9400E+5,INPU0884  *COR
     *-2.2533E+5,-2.2533E+5, 5.9600E+3, 5.9600E+3,-1.4050E+5,-1.4050E+5,INPU0885  *COR
     *-2.8300E+5,-2.8300E+5,-3.6262E+5,-3.6262E+5,-3.1430E+4,-3.1430E+4,INPU0886  *COR
     * 5.2100E+4, 5.2100E+4, 3.3610E+4, 3.3610E+4,-5.8845E+4,-5.8845E+4/INPU0887  *COR
      DATA (RAX(I),I=337,450)/                                                    *COR
     * 8.1000E+4, 8.1000E+4, 9.4920E+3, 9.4920E+3, 9.0000E+4, 9.0000E+4,INPU0889  *COR
     *-1.8143E+5,-1.8143E+5, 4.0070E+4, 4.0070E+4,-3.2530E+4,-3.2530E+4,INPU0890  *COR
     *-1.0970E+4,-1.0970E+4, 2.2790E+4, 2.2790E+4, 7.8000E+3, 7.8000E+3,INPU0891  *COR
     * 3.8410E+4, 3.8410E+4, 8.0000E+4, 8.0000E+4, 2.0100E+4, 2.0100E+4,INPU0892  *COR
     * 5.0400E+4, 5.0400E+4,-3.9900E+4,-3.9900E+4, 1.1296E+5, 1.1296E+5,INPU0893  *COR
     * 2.1530E+4, 2.1560E+4, 7.9100E+3, 7.9100E+3, 8.9000E+4, 8.9000E+4,INPU0894  *COR
     * 1.9610E+4, 1.9610E+4, 1.9800E+4, 1.9800E+4, 2.1700E+3, 2.1700E+3,INPU0895  *COR
     * 2.7000E+3, 2.7000E+3, 5.9550E+4, 5.9550E+4,-2.4000E+4,-2.4000E+4,INPU0896  *COR
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910.          *-7.3600E+4,-7.3600E+4, 3.4100E+4, 3.4100E+4, 1.0770E+5, 1.0770E+5,INPU0897                *COR
911.          * 1.4100E+5, 1.4100E+5, 1.5200E+5, 1.5200E+5,-1.1750E+5,-1.1750E+5,INPU0898                *COR
912.          *-1.7540E+5,-1.7540E+5,-2.0000E+5,-2.0000E+5,-1.5000E+4,-1.5000E+4,INPU0899                *COR
913.          *-4.1000E+4,-4.1000E+4,-3.2120E+5,-3.2120E+5,-2.6000E+4,-2.6000E+4,INPU0900                *COR
914.          *-1.6036E+5,-1.6036E+5,-4.4300E+5,-4.4300E+5, 1.9800E+5, 1.9800E+5,INPU0901                *COR
915.          *-2.5900E+5,-2.5900E+5,-3.2300E+5,-3.2300E+5,-2.1200E+5,-2.1200E+5,INPU0902                *COR
916.          * 2.9000E+3, 2.9000E+3, 1.0100E+4, 1.0100E+4,-3.8200E+5,-3.8200E+5,INPU0903                *COR
917.          *-4.7500E+5,-4.7500E+5,-2.9100E+5,-2.9100E+5, 2.5000E+3, 2.5000E+3,INPU0904                *COR
918.          * 2.3800E+4, 2.3800E+4,-6.8000E+4,-6.8000E+4, 1.0194E+5, 1.0194E+5,INPU0905                *COR
919.          *-1.0340E+4,-1.0340E+4,-1.8640E+4,-1.8640E+4,-3.2100E+4,-3.2100E+4,INPU0906                *COR
920.          *-1.5000E+4,-1.5000E+4,-2.3100E+5,-2.3100E+5,-2.6300E+5,-2.6300E+5/INPU0907                *COR
921.           DATA (RAX(I),I=451,556)/                                                                  *COR
922.          *-4.3000E+4,-4.3000E+4,-2.0000E+3,-2.0000E+3, 5.0000E+3, 5.0000E+3,INPU0908                *COR
923.          *-1.8000E+4,-5.4000E+4,-3.4220E+5,-3.4220E+5, 1.7000E+4, 1.7000E+4,INPU0910                *COR
924.          *-1.8200E+5,-1.8200E+5, 5.7000E+4, 5.7000E+4, 1.9000E+4, 1.9000E+4,INPU0911                *COR
925.          * 1.6400E+4, 1.6400E+4, 1.9400E+4, 1.9400E+4, 5.0900E+4, 5.0900E+4,INPU0912                *COR
926.          *-5.9300E+4,-5.9300E+4,-3.0700E+5,-3.0700E+5,-1.2940E+5,-1.2940E+5,INPU0913                *COR
927.          *-1.1520E+5,-1.1520E+5, 2.3000E+4, 2.3000E+4,-2.8790E+5,-2.8790E+5,INPU0914                *COR
928.          * 1.3970E+5, 1.3970E+5, 1.1300E+5, 1.1300E+5, 6.8500E+4, 6.8500E+4,INPU0915                *COR
929.          *-5.7000E+4,-5.7000E+4, 2.7640E+5, 2.7640E+5, 3.0000E+3, 3.0000E+3,INPU0916                *COR
930.          * 4.3000E+4, 4.3000E+4, 1.1400E+5, 1.1400E+5, 1.7200E+5, 1.7200E+5,INPU0917                *COR
931.          * 1.2800E+5, 1.2800E+5, 1.3300E+5, 1.3300E+5, 1.4700E+5, 1.4700E+5,INPU0918                *COR
932.          * 9.5000E+4, 9.5000E+4,-2.9700E+3,-2.9700E+3,-3.2030E+4,-3.2030E+4,INPU0919                *COR
933.          * 3.0000E+4, 3.0000E+4,-4.4000E+4,-4.4000E+4, 5.0100E+4, 5.0100E+4,INPU0920                *COR
934.          * 5.1100E+4, 5.1100E+4, 5.0000E+4, 5.0000E+4, 3.0000E+4, 3.0000E+4,INPU0921                *COR
935.          *-1.1840E+5,-1.1840E+5,-9.6000E+4,-9.6000E+4,-6.2945E+5,-6.2945E+5,INPU0922                *COR
936.          *-3.9000E+4,-3.9000E+4,-2.4400E-1,-2.4400E-1,-8.5600E-1,-8.5600E-1,INPU0923                *COR
937.          *-1.1000E-1,-1.1000E-1, 5.7400E-1, 5.7400E-1, 3.8100E+4, 3.8100E+4,INPU0924                *COR
938.          * 9.9000E+4, 9.9000E+4,-4.5350E+5,-4.5350E+5, 0.0000E+0, 0.0000E+0,INPU0925                *COR
939.          * 6.5925E+4, 6.5925E+4,-2.0320E+4,-2.0320E+4/                                              *COR
940.           DATA (RAX(I),I=557,582)/                                                                  *COR
941.          * 1.2770E+5, 1.2770E+5, 1.0652E+5, 1.0652E+5, 7.6485E+4, 7.6485E+4,                       *COR
942.          * 4.4294E+4, 4.4294E+4, 3.2431E+4, 3.2431E+4, 1.5520E+5, 1.5520E+5,                       *COR
943.          * 1.1172E+5, 1.1172E+5,                                                                   *COR
944.          * 0.0000E+0, 0.0000E+0,-1.5120E+5,-1.5120E+5,-8.0470E+5,-8.0470E+5,INPU0926                *COR
945.          *-1.8560E+5,-1.8560E+5,-3.0170E+5,-3.0170E+5,-1.7100E+4,-1.7100E+4/INPU0927               *COR
946.           DATA (RAX(I),I=583,690)/                                                                  *COR
947.          *-1.4200E+4,-1.4200E+4,-7.5180E+4,-7.5180E+4,-7.0690E+4,-7.0690E+4,INPU0929                *COR
948.          *-8.5664E+4,-8.5664E+4,-2.1650E+5,-2.1650E+5,-1.6128E+5,-1.6128E+5,INPU0930                *COR
949.          *-7.6100E+5,-7.6100E+5,-2.8435E+5,-2.8435E+5,-7.6000E+4,-7.6000E+4,INPU0931                *COR
950.          *-6.1861E+5,-6.1861E+5,-5.1556E+4,-5.1556E+4,-5.9970E+4,-5.9970E+4,INPU0932                *COR
951.          * 5.6200E+2, 5.6500E+2,-4.7800E+4,-4.7800E+4,-1.7800E+5,-1.7800E+5,INPU0933                *COR
952.          *-5.0603E+5,-5.0603E+5, 0.0000E+0, 2.0720E+3,-4.0040E+5,-3.7336E+5,INPU0934                *COR
953.          *-7.7400E-1, 5.2600E+3,-7.0364E+5,-2.9926E+5,-9.2960E+3, 1.8095E+4,INPU0935                *COR
954.          *-7.7400E-1, 2.8510E+3,-1.4310E+5,-1.2956E+5,-2.1700E+4,-3.7980E+3,INPU0936                *COR
955.          *-1.4026E+5,-1.1E40E+5,-9.7674E+4,-9.3394E+4,-1.4745E+5,-1.4308E+5,INPU0937                *COR
956.          *-1.1548E+5,-1.1326E+5,-1.4410E+5,-1.3213E+5,-2.1770E+5,-2.1574E+5,INPU0938                *COR
957.          *-3.7303E-1, 1.1505E+4,-2.4425E+5,-2.3582E+5,-1.1360E+5,-1.1742E+5,INPU0939                *COR
958.          *-2.4540E+5,-2.4427E+5,-3.9424E+5,-3.8744E+5,-5.4500E+5,-5.4500E+5,INPU0940                *COR
959.          *-8.0360E+5,-7.9276E+5,-1.1137E+6,-1.1137E+6,-1.4136E+6,-1.4136E+6,INPU0941                *COR
960.          *-3.3710E+5,-3.3710E+5,-2.9564E+5,-2.8163E+5,-3.9024E+5,-3.9024E+5,INPU0942                *COR
961.          *-5.3400E+5,-5.4129E+5,-1.6294E+6,-1.6294E+6,-7.4196E+5,-7.4196E+5,INPU0943                *COR
962.          *-5.8650E+5,-5.8650E+5,-1.7000E+3,-1.7000E+3,-2.1660E+4,-1.8573E+4,INPU0944                *COR
963.          *-1.9187E+5,-1.9187E+5,-2.6147E+5,-2.6147E+5, 1.0240E+4, 1.0240E+4,INPU0945                *COR
964.          *-4.5522E+4,-4.5522E+4,-2.0000E+4,-2.0000E+4,-6.1207E+5,-6.0064E+5/INPU0946                *COR
965.           DATA (RBX(I),I=1,108)/                                                                    *COR
966.          * 3.6636E+4, 3.6561E+4, 2.1269E+4, 2.1224E+4, 3.0390E+4, 3.0250E+4,INPU0948                *COR
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      * 2.2420E+0, 2.2370E+4, 1.4048E+4, 1.4020E+0, 4.8489E+4, 4.8318E+4,INPUT943   *COR
      * 2.1447E+4, 2.1398E+4, 2.1122E+4, 2.1070E+4, 1.3525E+4, 1.3549E+4,INPUT950   *COR
      * 2.4726E+4, 2.4675E+4, 3.1054E+4, 3.0987E+4, 5.1213E+4, 5.1129E+4,INPUT951   *COR
      * 6.5491E+4, 6.5380E+4, 1.3478E+4, 1.3453E+4, 2.4162E+4, 2.4159E+4,           *COR
      * 2.4852E+4, 2.4801E+4, 3.6775E+4, 3.6769E+4, 5.2135E+4, 5.2116E+4,,INPUT954  *COR
      * 3.9207E+4, 3.9202E+4, 3.7095E+4, 3.7090E+4, 5.2477E+4, 5.2472E+4,INPUT955   *COR
      * 5.2813E+4, 5.2810E+4, 2.4041E+4, 2.4037E+4, 3.8703E+4, 3.8694E+4,INPUT956   *COR
      * 3.6410E+4, 3.6407E+4, 5.1759E+4, 5.1747E+4, 2.3426E+4, 2.3394E+4,INPUT957   *COR
      * 3.6795E+4, 3.6751E+4, 4.8162E+4, 4.8078E+4, 2.3907E+4, 2.3902E+4,INPUT958   *COR
      * 2.7098E+4, 2.6860E+4, 1.1628E+5, 1.1623E+5, 3.6362E+4, 3.6353E+4,INPUT959   *COR
      * 5.0533E+4, 5.0508E+4, 1.3430E+4, 1.3421E+4, 2.4011E+4, 2.4007E+4,INPUT960   *COR
      * 3.5833E+4, 3.5815E+4, 5.0433E+4, 5.0397E+4, 3.7931E+4, 3.7894E+4,INPUT961   *COR
      * 3.6371E+4, 3.6362E+4, 5.1151E+4, 5.1127E+4, 5.1710E+4, 5.1696E+4,INPUT962   *COR
      * 2.3314E+4, 2.3298E+4, 2.7346E+4, 2.7300E+4, 3.5292E+4, 3.5262E+4,INPUT963   *COR
      * 4.9760E+4, 4.9711E+4, 2.2704E+4, 2.2654E+4, 3.572AE+4, 3.563AE+4,INPUT964   *COR
      * 4.584AE+4, 4.571AE+4, 3.4855E+4, 3.4537E+4, 6.0567E+4, 6.0406E+4,INPUT965   *COR
      * 4.278AE+4, 4.254AE+4, 7.9067E+4, 7.8804E+4, 2.3476E+4, 2.3372E+4/INPUT966   *COR
       DATA (RBX(I),I=104,223)/                                                     *COR
      * 2.2704E+4, 2.2650E+4, 2.3023E+4, 2.3015E+4, 7.995AE+4, 7.9934E+4,INPUT968   *COR
      * 9.6344E+4, 9.5926E+4, 5.1041E+4, 5.1759E+4, 6.379AE+4, 6.3695E+4,INPUT969   *COR
      * 1.2637E+5, 1.2631E+5, 1.2341E+5, 1.2329E+5, 1.6120E+5, 1.6039E+5,INPUT970   *COR
      * 1.5092E+5, 1.5038E+5, 1.7703E+5, 1.7637E+5, 3.1602E+5, 3.1503E+5,INPUT971   *COR
      * 1.3463E+4, 1.3414E+4, 3.6864E+4, 3.6800E+4, 2.3994E+4, 2.3961E+4,INPUT972   *COR
      * 3.8630E+4, 3.8514E+4, 3.9166E+4, 3.9157E+4, 2.3487E+4, 2.3473E+4,INPUT973   *COR
      * 3.8343E+4, 3.8318E+4, 2.2993E+4, 2.2952E+4, 3.2294E+4, 3.2206E+4,INPUT974   *COR
      * 3.4725E+4, 3.4620E+4, 6.0021E+4, 5.9850E+4, 2.3213E+4, 2.3192E+4,INPUT975   *COR
      * 8.4462E+4, 8.4456E+4, 4.9893E+4, 4.9853E+4, 7.7045E+4, 7.6928E+4,INPUT976   *COR
      * 1.0799E+5, 1.0790E+5, 1.3734E+5, 1.3722E+5, 1.6658E+5, 1.6643E+5,INPUT977   *COR
      * 2.4046E+4, 2.4035E+4, 4.9932E+4, 4.9882E+4, 6.5474E+4, 6.5434E+4,INPUT978   *COR
      * 3.8740E+4, 3.8687E+4, 5.0652E+4, 5.0612E+4, 6.7015E+4, 6.6997E+4,INPUT979   *COR
      * 6.7715E+4, 6.7706E+4, 2.3687E+4, 2.3666E+4, 3.7082E+4, 3.7024E+4,INPUT980   *COR
      * 3.5398E+4, 3.5402E+4, 4.9141E+4, 4.9079E+4, 4.9935E+4, 4.9896E+4,INPUT981   *COR
      * 6.4612E+4, 6.4560E+4, 2.3649E+4, 2.3501E+4, 6.2381E+4, 6.2270E+4,INPUT982   *COR
      * 6.2873E+4, 6.2769E+4, 6.3546E+4, 6.3452E+4, 4.6410E+4, 4.6289E+4,INPUT983   *COR
      * 6.1282E+4, 6.1151E+4, 3.5031E+4, 3.4925E+4, 4.6394E+4, 4.6264E+4,INPUT984   *COR
      * 3.3029E+4, 3.2942E+4, 3.3628E+4, 3.3780E+4, 5.9007E+4, 5.8816E+4,INPUT985   *COR
      * 5.9743E+4, 5.9566E+4, 5.8208E+4, 5.8000E+4, 4.4062E+4, 4.3866E+4/INPUT986   *COR
       DATA (RBX(I),I=223,336)/                                                     *COR
      * 4.2950E+4, 4.2729E+4, 5.6383E+4, 5.6125E+4, 1.0933E+5, 1.0276E+5,INPUT988   *COR
      * 5.5601E+4, 5.5326E+4, 1.0889E+5, 1.0170E+5, 5.3539E+4, 5.3203E+4,INPUT989   *COR
      * 2.3159E+4, 2.3264E+4, 5.2455E+4, 5.2359E+4, 7.9427E+4, 7.9342E+4,INPUT990   *COR
      * 6.7903E+4, 6.7560E+4, 8.1421E+4, 8.1457E+4, 5.1247E+4, 5.1146E+4,INPUT991   *COR
      * 6.5476E+4, 6.5349E+4, 2.3148E+5, 2.0516E+5, 8.0342E+4, 8.0185E+4,INPUT992   *COR
      * 1.4005E+4, 1.4022E+4, 2.4128E+4, 2.4125E+4, 5.1955E+4, 5.1946E+4,INPUT993   *COR
      * 6.5192E+4, 6.5147E+4, 5.2124E+4, 5.2118E+4, 6.7201E+4, 6.7186E+4,INPUT994   *COR
      * 3.3045E+4, 3.2971E+4, 6.0870E+4, 6.0708E+4, 2.4412E+4, 2.4410E+4,INPUT995   *COR
      * 3.6031E+4, 3.6018E+4, 3.7158E+4, 3.7122E+4, 2.4063E+4, 2.4059E+4,INPUT996   *COR
      * 3.6601E+4, 3.6585E+4, 2.4459E+4, 2.4452E+4, 6.3245E+4, 6.3137E+4,INPUT997   *COR
      * 5.2917E+4, 5.2916E+4, 3.6728E+4, 3.6725E+4, 3.7066E+4, 3.7058E+4,INPU 998   *COR
      * 6.8307E+4, 6.8300E+4, 6.5717E+4, 6.5658E+4, 8.3389E+4, 8.3380E+4,INPU 999   *COR
      * 6.8406E+4, 6.8402E+4, 1.3679E+4, 1.3682E+4, 3.2413E+4, 3.2325E+4,INPU1000   *COR
      * 6.0393E+4, 6.0226E+4, 2.4126E+4, 2.4121E+4, 3.6145E+4, 3.6136E+4,INPU1001   *COR
      * 2.3772E+4, 2.3763E+4, 3.5233E+4, 3.5195E+4, 6.6377E+4, 6.6350E+4,INPU1002   *COR
      * 2.4026E+4, 2.4014E+4, 2.4024E+4, 2.4011E+4, 6.159AE+4, 6.1466E+4,INPU1003   *COR
      * 5.2110E+4, 5.2104E+4, 3.616AE+4, 3.615AE+4, 3.6302E+4, 3.6281E+4,INPU1004   *COR
      * 6.4044E+4, 6.3964E+4, 8.343AE+4, 8.3429E+4, 5.0A32E+4, 5.0A12E+4,INPU1005   *COR
      * 1.3423E+4, 1.3423E+4, 2.3944E+4, 2.3917E+4, 3.2653E+4, 3.2575E+4/INPU1006   *COR
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      DATA (RPX(I),I=337,450)/                                                  *COR
     * 2.1A53E+4, 2.1791E+4, 2.1490E+4, 2.1430E+4, 2.3024E+4, 2.2965E+4,INPU100A *COR
     * 7.440AE+4, 7.427AE+4, 3.0777E+4, 3.0632E+4, 4.4765E+4, 4.3911E+4,INPU1009 *COR
     * 4.1AA1E+4, 4.1692E+4, 6.8946E+4, 6.8644E+4, 5.8733E+4, 5.8520E+4,INPU1010 *COR
     * 1.3544E+4, 1.3491E+4, 2.4621E+4, 2.4619E+4, 2.4312E+4, 2.4309E+4,INPU1011 *COR
     * 2.54A1E+4, 2.5480E+4, 3.9025E+4, 3.9016E+4, 1.3441E+4, 1.3428E+4,INPU1012 *COR
     * 2.2751E+4, 2.2715E+4, 3.4548E+4, 3.4500E+4, 2.5350E+4, 2.5253E+4,INPU1013 *COR
     * 3.6642E+4, 3.657AE+4, 6.1892E+4, 6.1812E+4, 7.873AE+4, 7.A637E+4,INPU1014 *COR
     * 9.161AE+4, 9.1590E+4, 1.3517E+4, 1.3521E+4, 2.3892E+4, 2.3858E+4,INPU1015 *COR
     * 3.80A8E+4, 3.8062E+4, 3.6051E+4, 3.6031E+4, 1.402AE+4, 1.4017E+4,INPU1016 *COR
     * 2.714AE+4, 2.7207E+4, 4.0085E+4, 4.0180E+4, 6.6260E+4, 6.6232E+4,INPU1017 *COR
     * 4.7424E+4, 4.7320E+4, 5.0099E+4, 5.0060E+4, 3.5564E+4, 3.5527E+4,INPU101A *COR
     * 3.485AE+4, 3.4815E+4, 1.0A19E+5, 1.0A14E+5, 4.9552E+4, 4.9497E+4,INPU1019 *COR
     * 4.7690E+4, 4.7583E+4, 8.3209E+4, 8.3197E+4, 2.3410E+4, 2.3394E+4,INPU102A *COR
     * 6.0763E+4, 6.0652E+4, 9.3740E+4, 9.3629E+4, 6.49A2E+4, 6.4939E+4,INPU1021 *COR
     * 5.0000E+4, 4.9951E+4, 3.5A07E+4, 3.5793E+4, 1.1854E+5, 1.1830E+5,INPU1022 *COR
     * 1.2099E+5, 1.20A1E+5, 1.1592E+5, 1.1561E+5, 6.4805E+4, 6.4746E+4,INPU1023 *COR
     * 3.2885E+4, 3.2791E+4, 3.A070E+4, 3.A041E+4, 2.3677E+4, 2.3665E+4,INPU1024 *COR
     * 4.7029E+4, 4.6920E+4, 4.7029E+4, 4.6923E+4, 6.1092E+4, 6.0961E+4,INPU1025 *COR
     * 3.7585E+4, 3.7550E+4, 5.0567E+4, 5.0537E+4, 5.1433E+4, 5.1417E+4/INPU1026 *COR
      DATA (RBX(I),I=451,556)/                                                  *COR
     * 3.4347E+4, 3.4252E+4, 8.0723E+4, 8.0687E+4, 3.2652E+4, 3.2565E+4,INPU1028 *COR
     * 5.2945E+4, 5.2544E+4, 7.719AE+4, 7.7129E+4, 4.9A70E+4, 4.9836E+4,INPU1029 *COR
     * 7.7756E+4, 7.7690E+4, 4.0361E+4, 4.0117E+4, 5.1927E+4, 5.1917E+4,INPU1030 *COR
     * 5.0054E+4, 5.0017E+4, 5.0199E+4, 5.0157E+4, 4.4024E+4, 4.3839E+4,INPU1031 *COR
     * 4.8875E+4, 4.8794E+4, 1.2623E+5, 1.2587E+5, 4.9904E+4, 4.9851E+4,INPU1032 *COR
     * 4.9563E+4, 4.9507E+4, 3.4683E+4, 3.4636E+4, 6.61AAE+4, 6.6148E+4,INPU1033 *COR
     * 3.6474E+4, 3.6401E+4, 3.7735E+4, 3.7695E+4, 3.8754E+4, 3.8640E+4,INPU1034 *COR
     * 6.3046E+4, 6.3036E+4, 2.2A04E+4, 2.2745E+4, 3.5A73E+4, 3.5850E+4,INPU1035 *COR
     * 3.5992E+4, 3.5974E+4, 3.5656E+4, 3.5640E+4, 2.6352E+4, 2.6346E+4,INPU1036 *COR
     * 3.8763E+4, 3.9000E+4, 3.8A86E+4, 3.8A65E+4, 3.8235E+4, 3.8A19E+4,INPU1037 *COR
     * 3.9094E+4, 3.9081E+4, 8.1904E+4, 8.1863E+4, 1.1466E+5, 1.1462E+5,INPU103A *COR
     * 4.9819E+4, 4.9700E+4, 3.8959E+4, 3.8943E+4, 5.3275E+4, 5.3223E+4,INPU1039 *COR
     * 5.0294E+4, 5.0184E+4, 3.736AE+4, 3.7217E+4, 3.3421E+4, 3.3480E+4,INPU1040 *COR
     * 7.9023E+4, 7.8929E+4, 5.2748E+4, 5.2746E+4, 1.1374E+5, 1.1372E+5,INPU1041 *COR
     * 6.5539E+4, 6.5495E+4, 2.4439E+4, 2.4434E+4, 2.4399E+4, 2.4437E+4,INPU1042 *COR
     * 2.2237E+4, 2.2184E+4, 2.3044E+4, 2.3055E+4, 3.7050E+4, 3.6991E+4,INPU1043 *COR
     * 3.7254E+4, 3.7247E+4, 8.5744E+4, 8.9759E+4, 1.4940E+4, 1.4940E+4,INPU1044 *COR
     * 5.6243E+4, 5.6243E+4, 8.9271E+4, 8.9271E+4/                               *COR
      DATA (RBX(I),I=557,582)/                                                  *COR
     * 4.8962E+4, 4.8962E+4, 6.3517E+4, 6.3517E+4, 7.0952E+4, 7.0952E+4,        *COR
     * 8.2247E+4, 8.2247E+4, 9.4621E+4, 9.4621E+4, 6.4503E+4, 6.4503E+4,        *COR
     * 7.6323E+4, 7.6323E+4,                                                     *COR
     * 1.3423E+4, 1.3423E+4, 9.7024E+4, 9.6836E+4, 2.3621E+5, 2.410AE+5,INPU1045 *COR
     * 5.1913E+4, 5.1496E+4, 1.5013E+5, 1.4023E+5, 3.2732E+4, 3.2600E+4/INPU1046 *COR
      DATA (RBX(I),I=583,690)/                                                  *COR
     * 7.4462E+4, 7.4491E+4, 1.3A46E+5, 1.1101E+5, 2.5545E+5, 2.254AE+5,INPU104A *COR
     * 1.0402E+5, 1.0402E+5, 1.1324E+5, 1.098AE+5, 8.1055E+4, 8.1055E+4,INPU1049 *COR
     * 6.7244E+4, 6.8842E+4,  .8768E+4, 6.9567E+4, 3.1163E+4, 3.1305E+4,INPU1050 *COR
     * 1.3645E+5, 1.3652E+5, 1.1773E+5, 1.1664E+5, 2.9520E+4, 2.908AE+4,INPU1051 *COR
     * 1.8540E+4, 1.8557E+4, 9.0932E+4, 8.5948E+4, 1.1464E+5, 1.0904E+5,INPU1052 *COR
     * 1.1348E+5, 1.1342E+5, 3.1984E+4, 2.0502E+4, 8.4352E+4, 8.5659E+4,INPU1053 *COR
     * 1.7587E+4, 1.7458E+4, 1.6282E+5, 7.9019E+4, 5.2956E+4, 7.9040E+4,INPU1054 *COR
     * 2.1622E+4, 1.4284E+4, 3.4146E+4, 3.5875E+4, 5.3322E+4, 5.2443E+4,INPU1055 *COR
     * 7.9275E+4, 8.6456E+4, 5.0220E+4, 4.6114E+4, 4.5984E+4, 4.1466E+4,INPU1056 *COR
     * 7.4176E+4, 5.6036E+4, 6.2000E+4, 6.2762E+4, 4.62ABE+4, 4.0499E+4,INPU1057 *COR
     * 1.8585E+4, 1.7662E+4, 9.9856E+4, 8.6401E+4, 4.3712E+4, 7.6316E+4,INPU105A *COR
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1081.      * 6.6176E+4, 6.7692E+4, 1.0961E+5, 1.0255E+5, 1.2664E+5, 1.2647E+5,INPU1059  *COR
1082.      * 2.4077E+5, 2.2657E+5, 2.4864E+5, 2.8084E+5, 3.5287E+5, 3.5114E+5,INPU1060  *COR
1083.      * 1.4472E+5, 1.6346E+5, 1.8475E+5, 1.1471E+5, 9.8927E+4, 9.8479E+4,INPU1061  *COR
1084.      * 2.1619E+5, 1.4608E+5, 3.4284E+5, 4.4250E+5, 1.8590E+5, 1.8687E+5,INPU1062  *COR
1085.      * 1.7472E+5, 1.4218E+5, 3.9649E+5, 4.1616E+5, 6.6016E+4, 4.0358E+4,INPU1063  *COR
1086.      * 7.6683E+4, 5.8551E+4, 1.2424E+5, 1.1440E+5, 1.9946E+5, 1.8184E+5,INPU1064  *COR
1087.      * 7.5949E+4, 7.5675E+4, 7.7546E+4, 7.7316E+4, 1.6406E+5, 1.5528E+5/INPU1065  *COR
1088.       DATA (RCX(I),I=1,108)/                                                     *COR
1089.      * 1.3073E+1, 1.4266E+1, 6.2626E+0, 8.0030E+0, 8.4750E+0, 1.3201E+1,INPU1067  *COR
1090.      * 7.7994E+0, 8.6695E+0, 5.5039E+0, 5.2640E+0, 1.5270E+1, 1.9961E+1,INPU1068  *COR
1091.      * 7.0554E+0, 8.6336E+0, 6.4131E+0, 8.5586E+0, 4.8618E+0, 5.1472E+0,INPU1069  *COR
1092.      * 7.6672E+0, 8.4361E+0, 1.0223E+1, 1.2524E+1, 1.6490E+1, 2.0473E+1,INPU1070  *COR
1093.      * 2.4175E+1, 2.6301E+1, 4.9168E+0, 3.6204E+0, 8.8485E+0, 8.9314E+0,          *COR
1094.      * 6.8663E+0, 6.3652E+0, 1.3041E+1, 1.3095E+1, 1.9696E+1, 1.9831E+1,INPU1073  *COR
1095.      * 1.4792E+1, 1.4874E+1, 1.3549E+1, 1.3905E+1, 1.9763E+1, 1.9848E+1,INPU1074  *COR
1096.      * 1.5819E+1, 1.9054E+1, 8.8747E+0, 8.9856E+0, 1.4731E+1, 1.4863E+1,INPU1075  *COR
1097.      * 1.3754E+1, 1.3873E+1, 1.9613E+1, 1.9812E+1, 8.3055E+0, 8.9103E+0,INPU1076  *COR
1098.      * 1.3958E+1, 1.4697E+1, 1.7102E+1, 1.9427E+1, 8.8424E+0, 8.9166E+0,INPU1077  *COR
1099.      * 7.4257E+0, 1.1932E+1, 4.3627E+1, 4.3656E+1, 1.3728E+1, 1.3868E+1,INPU1078  *COR
1100.      * 1.9548E+1, 1.9752E+1, 4.9516E+0, 4.4697E+0, 8.8644E+0, 8.9247E+0,INPU1079  *COR
1101.      * 1.4537E+1, 1.3826E+1, 1.9091E+1, 1.9701E+1, 1.4041E+1, 1.4729E+1,INPU1080  *COR
1102.      * 1.3734E+1, 1.3669E+1, 1.9362E+1, 1.9757E+1, 1.9585E+1, 1.9805E+1,INPU1081  *COR
1103.      * 8.5411E+0, 8.6544E+0, 1.3050E+1, 1.4690E+1, 1.3261E+1, 1.3767E+1,INPU1082  *COR
1104.      * 1.8819E+1, 1.9642E+1, 7.6267E+0, 8.7027E+0, 1.2678E+1, 1.4479E+1,INPU1083  *COR
1105.      * 1.5770E+1, 1.9165E+1, 1.1721E+1, 1.4390E+1, 2.1508E+1, 2.5055E+1,INPU1084  *COR
1106.      * 1.3169E+1, 1.2704E+1, 2.6954E+1, 3.3851E+1, 8.2881E+0, 9.1753E+0/INPU1085  *COR
1107.       DATA (RCX(I),I=109,222)/                                                   *COR
1108.      * 8.0618E+0, 7.7617E+0, 8.7727E+0, 8.9040E+0, 3.0296E+1, 3.0696E+1,INPU1087  *COR
1109.      * 5.3132E+1, 4.1734E+1, 1.8095E+1, 2.0480E+1, 2.3479E+1, 2.5350E+1,INPU1088  *COR
1110.      * 4.4252E+1, 4.9350E+1, 4.7011E+1, 4.9693E+1, 5.8656E+1, 6.6062E+1,INPU1089  *COR
1111.      * 5.2294E+1, 6.9872E+1, 6.3194E+1, 7.6347E+1, 1.1408E+2, 1.3042E+2,INPU1090  *COR
1112.      * 4.8632E+0,-1.2613E-1, 1.3425E+1, 1.4605E+1, 8.8465E+0, 8.3859E+0,INPU1091  *COR
1113.      * 1.4578E+1, 1.4830E+1, 1.4701E+1, 1.4854E+1, 8.6483E+0, 8.6767E+0,INPU1092  *COR
1114.      * 1.4356E+1, 1.4786E+1, 7.9351E+0, 8.7470E+0, 1.0877E+1, 1.3410E+1,INPU1093  *COR
1115.      * 1.2405E+1, 1.4609E+1, 2.0551E+1, 2.4957E+1, 8.4776E+0, 8.6434E+0,INPU1094  *COR
1116.      * 3.1474E+1, 3.1766E+1, 1.9004E+1, 1.9688E+1, 2.9266E+1, 3.1244E+1,INPU1095  *COR
1117.      * 4.1648E+1, 4.4254E+1, 5.3057E+1, 5.5060E+1, 6.4519E+1, 6.6878E+1,INPU1096  *COR
1118.      * 8.8371E+0, 8.1161E+0, 1.8741E+1, 1.9639E+1, 2.5002E+1, 2.5645E+1,INPU1097  *COR
1119.      * 1.3602E+1, 1.4660E+1, 1.8852E+1, 1.9683E+1, 2.5861E+1, 2.5747E+1,INPU1098  *COR
1120.      * 2.5642E+1, 2.5784E+1, 8.6071E+0, 8.8381E+0, 1.3444E+1, 1.4627E+1,INPU1099  *COR
1121.      * 1.3470E+1, 1.1708E+1, 1.8462E+1, 1.9479E+1, 1.9039E+1, 1.9686E+1,INPU1100  *COR
1122.      * 2.4711E+1, 2.5584E+1, 6.0476E+0, 4.4941E+0, 2.2838E+1, 2.1287E+1,INPU1101  *COR
1123.      * 2.2961E+1, 2.5314E+1, 2.3204E+1, 2.5368E+1, 1.6457E+1, 1.9247E+1,INPU1102  *COR
1124.      * 2.2414E+1, 2.5196E+1, 1.1517E+1, 1.4771E+1, 1.5903E+1, 1.9200E+1,INPU1103  *COR
1125.      * 1.1411E+1, 1.5313E+1, 1.0225E+1, 1.4554E+1, 2.0506E+1, 2.4892E+1,INPU1104  *COR
1126.      * 2.0803E+1, 2.4958E+1, 2.0187E+1, 2.4617E+1, 1.4656E+1, 1.4928E+1/INPU1105  *COR
1127.       DATA (RCX(I),I=223,336)/                                                   *COR
1128.      * 1.5965E+1, 1.8745E+1, 1.5470E+1, 2.0560E+1, 2.9517E+1, 3.6151E+1,INPU1107  *COR
1129.      * 1.0105E+1, 2.4475E+1, 2.0474E+1, 3.5292E+1, 1.6194E+1, 2.4178E+1,INPU1108  *COR
1130.      * 7.2259E+0, 1.1870E+1, 1.9558E+1, 2.0602E+1, 2.9900E+1, 3.1393E+1,INPU1109  *COR
1131.      * 2.1864E+1, 3.0098E+1, 2.7025E+1, 3.5956E+1, 1.8327E+1, 2.0390E+1,INPU1110  *COR
1132.      * 2.3721E+1, 2.6229E+1, 8.1216E+0, 8.8356E+0, 2.8903E+1, 3.2053E+1,INPU1111  *COR
1133.      * 5.4085E+0, 5.0523E+0, 8.8816E+0, 8.9283E+0, 1.9694E+1, 1.9833E+1,INPU1112  *COR
1134.      * 2.4583E+1, 2.5625E+1, 1.9752E+1, 1.9844E+1, 2.5522E+1, 2.5762E+1,INPU1113  *COR
1135.      * 1.1268E+1, 1.3494E+1, 2.1672E+1, 2.5073E+1, 8.9130E+0, 6.9360E+0,INPU1114  *COR
1136.      * 1.3633E+1, 1.3844E+1, 1.3087E+1, 1.3746E+1, 8.8561E+0, 8.9228E+0,INPU1115  *COR
1137.      * 1.4573E+1, 1.5834E+1, 8.9199E+0, 8.9656E+0, 2.4164E+1, 2.5320E+1,INPU1116  *COR
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1138.          * 1.9551E+1, 1.9864E+1, 1.3043E+1, 1.3494E+1, 1.3434E+1, 1.1870E+1,INPU1117                    *COR
1139.          * 2.5697E+1, 2.5601E+1, 2.4366E+1, 2.4554E+1, 3.1609E+1, 3.1752E+1,INPU111A                    *COR
1140.          * 2.5745E+1, 2.5812E+1, 5.0377E+0, 4.9836E+0, 1.0934E+1, 1.3424E+1,INPU1119                    *COR
1141.          * 2.1758E+1, 2.5047E+1, 8.6363E+0, 8.9196E+0, 1.3714E+1, 1.3865E+1,INPU1120                    *COR
1142.          * 8.7447E+0, 8.4564E+0, 1.3632E+1, 1.3731E+1, 2.5287E+1, 2.5704E+1,INPU1121                    *COR
1143.          * 8.7682E+0, 8.6736E+0, 8.8434E+0, 8.3281E+0, 2.2687E+1, 2.5213E+1,INPU1122                    *COR
1144.          * 1.9770E+1, 1.9646E+1, 1.3717E+1, 1.3666E+1, 1.3697E+1, 1.1741E+1,INPU1123                    *COR
1145.          * 2.3921E+1, 2.5457E+1, 3.1411E+1, 3.1752E+1, 1.9463E+1, 1.9777E+1,INPU1124                    *COR
1146.          * 4.9680E+0, 4.9674E+0, 8.5324E+0, 8.3574E+0, 1.1100E+1, 1.3459E+1/INPU1125                    *COR
1147.           DATA (RCX(I),I=347,450)/                                                                     *COR
1148.          * 6.8659E+0, 8.6101E+0, 6.5792E+0, 8.5195E+0, 7.9169E+0, 7.2587E+0,INPU1127                    *COR
1149.          * 2.5094E+1, 3.0833E+1, 8.3122E+0, 1.3169E+1, 1.3014E+1, 1.4067E+1,INPU1128                    *COR
1150.          * 1.2069E+1, 1.6488E+1, 2.2059E+1, 3.0219E+1, 2.0626E+1, 2.4833E+1,INPU1129                    *COR
1151.          * 4.7171E+0,-1.7656E+0, 8.9014E+0, 8.9335E+0, 8.8922E+0, 6.9289E+0,INPU1130                    *COR
1152.          * 8.9393E+0, 6.9414E+0, 1.4716E+1, 1.4862E+1, 4.9246E+0, 2.7772E+0,INPU1131                    *COR
1153.          * 8.0817E+0, 8.7730E+0, 1.2660E+1, 1.3689E+1, 7.6441E+0, 1.1811E+1,INPU1132                    *COR
1154.          * 1.3357E+1, 1.4603E+1, 2.3037E+1, 2.4463E+1, 2.9560E+1, 3.1322E+1,INPU1133                    *COR
1155.          * 3.5291E+1, 3.5643E+1, 4.9618E+0, 4.5011E+0, 8.6251E+0, 7.6872E+0,INPU1134                    *COR
1156.          * 1.4344E+1, 1.4782E+1, 1.3495E+1, 1.3816E+1, 4.6321E+0, 5.8115E+0,INPU1135                    *COR
1157.          * 1.1403E+1, 9.5560E+0, 1.4478E+1, 1.6115E+1, 2.5248E+1, 2.5700E+1,INPU1136                    *COR
1158.          * 1.7271E+1, 1.9375E+1, 1.9068E+1, 1.8322E+1, 1.3044E+1, 1.3737E+1,INPU1137                    *COR
1159.          * 1.2914E+1, 1.3705E+1, 4.1643E+1, 4.2645E+1, 1.8686E+1, 1.9611E+1,INPU1138                    *COR
1160.          * 1.7383E+1, 1.9372E+1, 3.1552E+1, 3.1736E+1, 8.5887E+0, 8.8649E+0,INPU1139                    *COR
1161.          * 2.1900E+1, 2.5139E+1, 3.5278E+1, 3.7234E+1, 2.4928E+1, 2.5632E+1,INPU1140                    *COR
1162.          * 1.8802E+1, 1.9644E+1, 1.3603E+1, 1.3839E+1, 4.3962E+1, 4.8529E+1,INPU1141                    *COR
1163.          * 4.5666E+1, 4.8629E+1, 4.2058E+1, 4.8235E+1, 2.4549E+1, 2.5557E+1,INPU1142                    *COR
1164.          * 1.1372E+1, 1.3459E+1, 1.4365E+1, 1.3756E+1, 8.6972E+0, 8.8882E+0,INPU1143                    *COR
1165.          * 1.6571E+1, 1.9308E+1, 1.6512E+1, 1.9308E+1, 2.1982E+1, 2.5196E+1,INPU1144                    *COR
1166.          * 1.4119E+1, 1.4734E+1, 1.9231E+1, 1.9729E+1, 1.9548E+1, 1.9796E+1/INPU1145                    *COR
1167.           DATA (RCX(I),I=451,554)/                                                                     *COR
1168.          * 1.1822E+1, 1.4384E+1, 3.1045E+1, 3.1623E+1, 1.1132E+1, 1.3451E+1,INPU1147                    *COR
1169.          * 1.9447E+1, 1.9867E+1, 2.9311E+1, 3.0475E+1, 1.9170E+1, 1.9711E+1,INPU114A                    *COR
1170.          * 2.9625E+1, 3.0461E+1, 1.4352E+1, 1.4249E+1, 1.9659E+1, 1.9822E+1,INPU1149                    *COR
1171.          * 1.9070E+1, 1.9696E+1, 1.8057E+1, 1.9675E+1, 1.4473E+1, 1.8946E+1,INPU1150                    *COR
1172.          * 1.7894E+1, 1.9509E+1, 4.4084E+1, 5.2850E+1, 1.8648E+1, 1.9625E+1,INPU1151                    *COR
1173.          * 1.8570E+1, 1.9605E+1, 1.2838E+1, 1.3688E+1, 2.4969E+1, 2.5644E+1,INPU1152                    *COR
1174.          * 1.2824E+1, 1.4545E+1, 1.4169E+1, 1.4353E+1, 1.3517E+1, 1.5962E+1,INPU1153                    *COR
1175.          * 3.1596E+1, 3.1747E+1, 7.7319E+0, 6.6106E+0, 1.340AE+1, 1.3801E+1,INPU1154                    *COR
1176.          * 1.3519E+1, 1.3625E+1, 1.1810E+1, 1.7205E+1, 8.8341E+0, 9.9782E+0,INPU1155                    *COR
1177.          * 1.3823E+1, 1.7644E+1, 1.4542E+1, 1.4598E+1, 1.3884E+1, 1.538AE+1,INPU1156                    *COR
1178.          * 1.4723E+1, 1.4255E+1, 3.0922E+1, 3.1551E+1, 4.416AE+1, 4.3150E+1,INPU1157                    *COR
1179.          * 1.7254E+1, 2.0254E+1, 1.4702E+1, 1.3924E+1, 1.9567E+1, 2.0616E+1,INPU1158                    *COR
1180.          * 1.7524E+1, 2.0305E+1, 1.4412E+1, 1.3461E+1, 1.0778E+1, 1.6542E+1,INPU1159                    *COR
1181.          * 2.9602E+1, 3.1352E+1, 1.9821E+1, 1.9A60E+1, 4.3216E+1, 4.3599E+1,INPU1160                    *COR
1182.          * 2.48A7E+1, 2.5624E+1, 8.6359E+0, 8.9185E+0, 8.933AE+0, 9.7059E+0,INPU1161                    *COR
1183.          * 7.6039E+0, 8.5895E+0, 8.0726E+0, 9.7778E+0, 1.3671E+1, 1.4231E+1,INPU1162                    *COR
1184.          * 1.3863E+1, 1.4657E+1, 3.6212E+1, 3.6925E+1, 4.1810E+0, 4.1810E+0,INPU1163                    *COR
1185.          * 2.3007E+1, 2.3903E+1, 4.A424E+1, 3.9312E+1/                                                 *COR
1186.           DATA (RCX(I),I=557,582)/                                                                     *COR
1187.          * 1.9446E+1, 1.995AE+1, 2.4744E+1, 2.6662E+1, 2.8693E+1, 2.9167E+1,                          *COR
1188.          * 3.7222E+1, 3.4427E+1, 3.9733E+1, 3.9507E+1, 2.5217E+1, 2.4936E+1,                          *COR
1189.          * 2.9890E+1, 3.0171E+1,                                                                       *COR
1190.          * 4.967AE+0, 4.967AE+0, 1.7190E+1, 1.9109E+1, 5.1911E+1, 4.0363E+1,INPU1164                    *COR
1191.          * 1.9205E+1, 2.029AE+1, 4.4964E+1, 5.5060E+1, 1.1363E+1, 1.2437E+1/INPU1165                    *COR
1192.           DATA (RCX(I),I=583,690)/                                                                     *COR
1193.          * 2.4353E+1, 2.4320E+1, 1.0316E+1, 3.0286E+1, 2.6256E+1, 7.7366E+1,INPU1167                    *COR
1194.          * 3.8500E+1, 3.8500E+1, 1.5654E+1, 1.7603E+1, 3.0000E+1, 3.0000E+1,INPU1168                    *COR
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1195.       * 2.4146E+1, 2.3695E+1, 2.2076E+1, 3.5026E+1, 1.2408E+1, 1.1942E+1,INPU1169                *COR
1196.       * 4.0773E+1, 4.0808E+1, 4.1234E+1, 4.4855E+1, 1.1280E+1, 1.0388E+1,INPU1170                *COR
1197.       * 6.8219E+0, 6.7989E+0, 3.0774E+1, 3.3646E+1, 3.2728E+1, 4.3491E+1,INPU1171                *COR
1198.       * 4.3367E+1, 4.0269E+1, 2.6809E+0, 7.5080E+0, 2.8773E+1, 3.4622E+1,INPU1172                *COR
1199.       * 5.6068E+0, 7.3001E+0,-1.7946E+0, 2.9804E+1, 2.3000E+1, 3.2520E+1,INPU1173                *COR
1200.       * 4.2931E+0, 7.9250E+0, 1.0622E+1, 1.6000E+1, 1.8114E+1, 2.2002E+1,INPU1174                *COR
1201.       * 3.2065E+1, 3.2001E+1, 1.0370E+1, 1.7521E+1, 1.0053E+1, 1.5340E+1,INPU1175                *COR
1202.       * 9.9257E+0, 2.0740E+1, 1.7445E+1, 2.4000E+1, 1.7404E+1, 2.0511E+1,INPU1176                *COR
1203.       * 5.4604E+0, 6.5000E+0, 1.4373E+1, 3.4558E+1, 2.2462E+1, 2.9020E+1,INPU1177                *COR
1204.       * 1.1416E+1, 1.3845E+1, 3.0894E+1, 4.0000E+1, 3.5032E+1, 3.9538E+1,INPU1178                *COR
1205.       * 4.7558E+1, 1.0114E+2, 8.1614E+1, 7.6250E+1, 1.1045E+2, 1.1088E+2,INPU1179                *COR
1206.       * 3.7206E+1, 6.0372E+1, 7.0881E+0, 4.4321E+1, 3.2377E+1, 3.3346E+1,INPU1180                *COR
1207.       * 2.2189E+1, 5.5500E+1, 1.2060E+2, 1.1204E+2, 7.0971E+1, 6.6165E+1,INPU1181                *COR
1208.       * 3.7881E+1, 6.9517E+1, 8.4657E+1, 1.7419E+2, 3.7210E+0, 1.4900E+1,INPU1182                *COR
1209.       * 1.3631E+1, 2.3636E+1, 2.6043E+1, 4.2291E+1, 5.9686E+1, 6.7238E+1,INPU1183                *COR
1210.       * 2.9515E+1, 2.7617E+1, 2.8410E+1, 2.7439E+1, 5.1062E+1, 6.0000E+1/INPU1184                *COR
1211.         DATA (RDX(I),I=1,108)/                                                                  *COR
1212.       * 7.3366E-4, 2.0983E-4, 9.3467E-4, 3.6202E-4, 1.8325E-3, 2.3113E-4,INPU1186                *COR
1213.       * 4.4145E-4, 8.6597E-5, 2.4001E-4, 2.1613E-4, 2.1387E-3, 4.5148E-4,INPU1187                *COR
1214.       * 7.1091E-4, 1.3281E-4, 8.2986E-4, 1.3813E-4, 7.5355E-5, 7.6670E-5,INPU1188                *COR
1215.       * 7.5822E-4, 4.4717E-4, 1.0066E-3, 2.3055E-4, 7.0445E-4, 5.8077E-5,INPU1189                *COR
1216.       * 9.4416E-4, 7.7518E-5, 3.0353E-5, 2.7750E-4, 1.2781E-4, 1.0929E-4,                        *COR
1217.       * 1.5288E-4, 6.7172E-4, 2.5915E-5, 2.3900E-6, 6.5923E-5, 6.2719E-6,INPU1192                *COR
1218.       * 4.1685E-5, 3.8524E-6, 8.0914E-6, 9.4385E-7, 4.0810E-5, 3.6685E-6,INPU1193                *COR
1219.       * 1.9832E-5, 1.9300E-6, 1.1410E-4, 9.8090E-5, 6.4798E-5, 6.2062E-6,INPU1194                *COR
1220.       * 5.8926E-5, 5.5773E-6, 9.6159E-5, 8.8091E-6, 3.8821E-4, 1.7961E-4,INPU1195                *COR
1221.       * 3.4815E-4, 3.0878E-5, 9.7846E-4, 6.4302E-5, 1.3162E-4, 9.4657E-5,INPU1196                *COR
1222.       * 1.6050E-7,-2.3623E-4, 3.4088E-5, 3.2831E-6, 6.7860E-5, 6.3272E-6,INPU1197                *COR
1223.       * 1.9485E-4, 1.7866E-5, 1.0067E-5, 1.0434E-4, 1.2265E-4, 9.6225E-5,INPU1198                *COR
1224.       * 1.3827E-4, 1.2620E-5, 2.8694E-4, 2.5576E-5, 3.0983E-4, 2.5995E-5,INPU1199                *COR
1225.       * 6.5913E-5, 6.1657E-6, 1.8822E-4, 1.7170E-5, 1.0708E-4, 1.0014E-5,INPU1200                *COR
1226.       * 2.1969E-4, 8.6130E-5, 3.7919E-4, 3.1900E-5, 2.3841E-4, 2.1388E-5,INPU1201                *COR
1227.       * 3.8529E-4, 3.4185E-5, 5.9728E-4, 1.7700E-4, 7.8441E-4, 6.2918E-5,INPU1202                *COR
1228.       * 1.3535E-3, 1.0251E-4, 1.0922E-3, 8.3036E-5, 1.4850E-3, 1.1449E-4,INPU1203                *COR
1229.       * 2.2724E-3, 1.7133E-4, 2.6030E-3, 1.9314E-4, 3.7280E-4, 1.3944E-4/INPU1204                *COR
1230.         DATA (RDX(I),I=109,222)/                                                                *COR
1231.       * 3.6433E-4, 2.9024E-4, 1.6625E-4, 1.0910E-4, 1.8660E-4, 1.6391E-5,INPU1206                *COR
1232.       * 3.6987E-3, 2.9316E-4, 7.0071E-4, 5.7196E-5, 8.7289E-4, 7.1736E-5,INPU1207                *COR
1233.       * 5.2882E-4, 4.8174E-5, 9.8102E-4, 8.7625E-5, 2.9162E-3, 2.1768E-4,INPU1208                *COR
1234.       * 5.1548E-3, 3.9398E-4, 5.7402E-3, 4.6496E-4, 8.5585E-3, 6.9335E-4,INPU1209                *COR
1235.       * 6.5025E-5, 1.1652E-3, 5.3076E-4, 4.4508E-5, 1.2868E-4, 2.0527E-4,INPU1210                *COR
1236.       * 1.2297E-4, 1.1110E-5, 7.5209E-5, 6.8970E-6, 1.8597E-4, 8.7495E-5,INPU1211                *COR
1237.       * 1.9985E-4, 1.7525E-5, 5.0003E-4, 1.7303E-4, 9.8146E-4, 7.2205E-5,INPU1212                *COR
1238.       * 8.8052E-4, 7.3480E-5, 1.7523E-3, 1.2728E-4, 2.3777E-4, 8.3268E-5,INPU1213                *COR
1239.       * 4.5385E-5, 4.1204E-6, 3.1763E-4, 2.8757E-5, 9.2717E-4, 8.2272E-5,INPU1214                *COR
1240.       * 7.5243E-4, 6.8660E-5, 9.5619E-4, 2.6866E-5, 1.1273E-3, 1.0265E-4,INPU1215                *COR
1241.       * 1.3677E-4, 2.8723E-4, 4.0480E-4, 3.4643E-5, 3.0731E-4, 2.7982E-5,INPU1216                *COR
1242.       * 7.2948E-4, 3.0607E-4, 3.3204E-4, 2.8100E-5, 1.3828E-4, 1.2769E-5,INPU1217                *COR
1243.       * 7.1462E-5, 6.5675E-6, 2.0491E-4, 1.8735E-4, 5.1259E-4, 4.0900E-5,INPU1218                *COR
1244.       * 2.1250E-4, 6.4005E-4, 5.0949E-4, 4.3540E-5, 3.0722E-4, 2.7627E-5,INPU1219                *COR
1245.       * 4.1370E-4, 3.7228E-5, 1.2231E-3, 1.4108E-4, 1.0262E-3, 8.0162E-5,INPU1220                *COR
1246.       * 9.7387E-4, 7.5464E-5, 8.9112E-4, 6.8074E-5, 1.1768E-3, 9.1902E-5,INPU1221                *COR
1247.       * 1.1809E-3, 9.3695E-5, 1.2197E-3, 8.7105E-5, 1.3106E-3, 9.7479E-5,INPU1222                *COR
1248.       * 8.9857E-4, 1.6437E-4, 1.4829E-3, 1.0672E-4, 1.8070E-3, 1.3783E-4,INPU1223                *COR
1249.       * 1.6993E-3, 1.2812E-4, 1.9300E-3, 1.4910E-4, 1.7955E-3, 1.3899E-4/INPU1224                *COR
1250.         DATA (RDX(I),I=223,336)/                                                                *COR
1251.       * 2.2465E-3, 1.6416E-4, 2.4625E-3, 1.6643E-4, 7.2006E-3, 2.5752E-3,INPU1226                *COR
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1252.      * 2.6195E-3, 1.5851E-4, 7.9027E-3, 2.9011E-3, 3.2452E-3, 2.4216E-4,INPU1227
1253.      * 9.0172E-4,-6.5451E-5, 4.5856E-4, 3.9104E-5, 6.8847E-4, 5.9754E-5,INPU1228
1254.      * 3.3338E-3, 2.4265E-4, 3.4885E-3, 2.6359E-4, 8.8905E-4, 7.0456E-5,INPU1229
1255.      * 1.0967E-3, 8.8557E-5, 2.8392E-2, 9.6413E-3, 1.3659E-3, 1.0900E-4,INPU1230
1256.      *-1.5018E-4,-1.2231E-5, 1.2827E-4, 1.0762E-4, 6.4754E-5, 5.7674E-6,INPU1231
1257.      * 3.4901E-4, 3.1474E-5, 4.5048E-5, 4.2567E-6, 1.1625E-4, 1.0701E-5,INPU1232
1258.      * 8.3692E-4, 5.9576E-5, 1.3981E-3, 1.1265E-4, 1.4821E-4, 1.3810E-4,INPU1233
1259.      * 1.0098E-4, 9.2587E-6, 6.6875E-4, 3.5980E-4, 1.4248E-4, 1.1319E-4,INPU1234
1260.      * 2.9917E-5, 1.8563E-4, 1.0883E-4, 1.9129E-4, 9.4109E-4, 7.6090E-5,INPU1235
1261.      * 8.0293E-6, 7.5208E-7, 2.5386E-5, 2.5171E-6, 4.0963E-5, 4.4931E-4,INPU1236
1262.      * 5.1291E-5, 5.0498E-6, 5.0965E-4, 4.0957E-5, 7.0103E-5, 6.5028E-6,INPU1237
1263.      * 3.1693E-5, 3.1736E-6,-2.5608E-5,-2.2884E-6, 9.5597E-4, 6.9872E-5,INPU1238
1264.      * 1.4399E-3, 1.1654E-4, 1.7600E-4, 1.3961E-4, 7.2541E-5, 6.9719E-6,INPU1239
1265.      * 1.7802E-4, 1.1178E-4, 3.1554E-4, 2.6614E-5, 2.0346E-4, 1.8750E-5,INPU1240
1266.      * 2.1314E-4, 2.0069E-4, 1.2234E-4, 2.1165E-4, 1.1189E-3, 9.2060E-5,INPU1241
1267.      * 3.0206E-5, 3.7534E-6, 7.1601E-5, 6.5699E-6, 8.9468E-5, 5.1245E-4,INPU1242
1268.      * 6.6036E-4, 5.5552E-5, 6.8082E-5, 6.2713E-6, 1.5219E-4, 1.4059E-5,INPU1243
1269.      * 3.9647E-9, 9.2105E-9, 3.6515E-4, 3.2947E-4, 8.9020E-4, 6.4435E-5/INPU1244
1270.       DATA (RDX(I),I=337,450)/                                          *COR
1271.      * 7.9729E-4, 1.6803E-4, 8.2277E-4, 1.5867E-4, 5.0314E-4, 4.9066E-4,INPU1245
1272.      * 1.8823E-3, 1.3782E-4, 1.5057E-3, 1.0755E-4, 2.4202E-3, 1.7448E-3,INPU1247
1273.      * 2.6091E-3, 9.3926E-4, 3.1732E-3, 2.2617E-4, 1.5383E-3, 1.4814E-4,INPU1248
1274.      * 1.5857E-4, 1.6205E-3, 2.1221E-4, 1.9830E-4, 1.5668E-4, 1.3999E-4,INPU1249
1275.      * 3.2487E-4, 3.2372E-4, 7.0205E-5, 6.3054E-6, 2.7136E-3, 5.2336E-4,INPU1250
1276.      * 3.5449E-4, 7.2652E-5, 3.8205E-4, 3.2990E-5, 1.1091E-3,-2.2451E-4,INPU1251
1277.      * 5.4776E-4, 4.4671E-5, 6.5259E-6, 5.6214E-5, 8.1239E-4, 7.0511E-5,INPU1252
1278.      * 1.9109E-4, 2.0051E-5, 5.6735E-6, 1.3392E-4, 1.7432E-4, 3.0516E-4,INPU1253
1279.      * 2.0549E-4, 1.6160E-5, 2.7962E-4, 1.4612E-4, 2.8758E-4,-3.9209E-5,INPU1254
1280.      *-5.6256E-5, 1.3766E-4, 2.9372E-4, 1.6046E-4, 2.1647E-4, 1.9884E-5,INPU1255
1281.      * 9.1146E-4, 7.3435E-5, 2.9649E-4, 3.6902E-4, 3.0992E-4, 2.5770E-5,INPU1256
1282.      * 3.5891E-4, 3.0499E-5, 4.0504E-4, 3.3874E-6, 4.4887E-4, 3.8862E-5,INPU1257
1283.      * 8.9131E-4, 7.4341E-5, 9.0744E-5, 8.6956E-6, 2.1001E-4, 9.1818E-5,INPU1258
1284.      * 1.3017E-3, 1.0101E-4, 9.9798E-4, 7.7545E-5, 3.3363E-4, 3.0097E-5,INPU1259
1285.      * 3.8986E-4, 3.4027E-5, 1.1409E-4, 1.0626E-5, 2.0455E-3, 1.7094E-4,INPU1260
1286.      * 1.4594E-3, 1.2684E-4, 2.6767E-3, 2.1543E-4, 4.6919E-4, 4.1367E-5,INPU1261
1287.      * 8.6963E-4, 6.6541E-5, 2.0386E-4, 2.6957E-4, 1.9294E-4, 1.1068E-4,INPU1262
1288.      * 1.0929E-3, 8.2045E-5, 1.1062E-3, 8.2804E-5, 1.2841E-3, 9.8751E-5,INPU1263
1289.      * 2.8671E-4, 2.5420E-5, 2.3612E-4, 2.1361E-5, 1.2054E-4, 1.1331E-5/INPU1264
1290.       DATA (RDX(I),I=451,556)/                                          *COR
1291.      * 1.0009E-3, 7.4216E-5, 2.7014E-4, 2.5046E-5, 9.0831E-4, 6.6485E-5,INPU1265
1292.      * 9.3983E-6, 8.8375E-7, 5.4563E-4, 4.8767E-5, 2.6057E-4, 2.4080E-5,INPU1267
1293.      * 4.3665E-4, 4.7646E-5, 7.0358E-4,-1.5667E-6, 7.9269E-5, 7.4334E-6,INPU1268
1294.      * 2.9459E-4, 2.6314E-5, 3.3044E-4, 2.9377E-5, 1.4080E-3, 1.3516E-4,INPU1269
1295.      * 5.8836E-4, 5.3386E-5, 3.5174E-5, 2.6179E-4, 4.3850E-4, 3.6599E-5,INPU1270
1296.      * 4.6749E-4, 3.9525E-5, 2.8753E-4, 2.3084E-5, 3.1693E-4, 2.9110E-5,INPU1271
1297.      * 7.0351E-4, 5.2573E-5, 2.7247E-4, 1.0094E-4, 8.5235E-4,-1.0109E-4,INPU1272
1298.      * 7.4459E-5, 6.9569E-6, 5.6507E-4, 5.6713E-4, 1.6332E-4, 1.6224E-5,INPU1273
1299.      * 1.4362E-4, 1.2702E-5, 1.4264E-3,-9.6952E-5, 2.9723E-4,-7.1462E-6,INPU1274
1300.      * 5.1361E-4, 2.4627E-4, 1.3584E-4, 5.8690E-5, 4.4857E-4, 6.2392E-4,INPU1275
1301.      * 7.0954E-5, 1.3875E-4, 3.2053E-4, 3.0088E-5,-1.8914E-4,-4.7796E-5,INPU1276
1302.      * 1.1982E-2, 8.8105E-5, 7.9677E-5, 2.2035E-4, 4.5768E-4, 3.6923E-5,INPU1277
1303.      * 1.1070E-3, 8.1504E-5, 3.0211E-4, 1.1266E-4, 1.2786E-3, 1.3563E-5,INPU1278
1304.      * 7.8411E-4, 6.5567E-5, 1.5091E-5, 1.7660E-5, 1.8692E-4, 1.7677E-5,INPU1279
1305.      * 3.4511E-4, 3.0400E-5, 2.4729E-4, 2.1132E-4, 1.1774E-4, 3.9077E-5,INPU1280
1306.      * 5.0147E-4, 9.7233E-5, 5.0304E-4, 1.1062E-4, 4.4650E-4, 1.2923E-4,INPU1281
1307.      * 3.7649E-4, 3.8305E-5, 1.0774E-4,-2.0793E-5, 1.2296E-5, 1.2296E-5,INPU1282
1308.      * 6.9132E-4, 3.5177E-4,-1.6972E-3, 7.6484E-4/                      *COR
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      DATA (REX(I),I=557,562)/                                                  *COR
     * 5.0838E-4, 2.4564E-4, 9.9292E-4, 3.6477E-4, 7.6603E-4, 4.5624E-4,       *COR
     *-5.2466E-5, 5.7817E-4, 9.5056E-4, 7.3372E-4, 5.7434E-4, 4.0251E-4,       *COR
     * 7.3594E-4, 4.5690E-4,                                                   *COR
     * 0.0000E+0, 0.0000E+0, 1.1762E-2, 1.0713E-2, 2.1943E-2, 2.4824E-2,INPU1283 *COR
     * 4.6588E-4,-1.1031E-4, 9.7667E-3, 1.2602E-3, 8.7132E-4, 4.1360E-4/INPU1284 *COR
      DATA (REX(I),I=563,690)/                                                  *COR
     * 2.4265E-3, 2.4465E-3, 2.4569E-2, 9.2427E-3, 4.1841E-2, 1.2406E-2,INPU1286 *COR
     *-4.6160E-4,-2.7880E-4, 1.6211E-2, 1.0457E-2,-4.3324E-4,-4.7945E-4,INPU1287 *COR
     * 8.1342E-4, 1.6917E-3, 2.9032E-3,-1.8099E-3,-1.0745E-4, 1.1715E-4,INPU1288 *COR
     * 6.7773E-3, 6.7655E-3, 2.4563E-3, 7.2347E-4, 4.1935E-4, 3.0361E-4,INPU1289 *COR
     *-3.4000E-5,-5.9234E-6, 3.1212E-3, 2.4790E-4, 7.0302E-3, 5.6028E-4,INPU1290 *COR
     * 9.3363E-4, 2.1458E-3, 5.3616E-3, 1.1641E-9, 2.2394E-3, 1.6019E-7,INPU1291 *COR
     * 7.8947E-4,-1.2806E-4, 3.7012E-2, 1.6529E-4, 5.3897E-3,-4.2766E-6,INPU1292 *COR
     * 2.2470E-3,-6.2543E-5, 1.5556E-3,-6.3330E-4, 2.1540E-3,-4.8056E-7,INPU1293 *COR
     *-2.5913E-4,-1.2666E-7, 5.0039E-3,-2.2539E-3, 4.2970E-3, 2.7940E-8,INPU1294 *COR
     * 1.0649E-2,-6.0536E-9, 3.5048E-3, 3.6321E-8, 2.9989E-4,-2.2319E-6,INPU1295 *COR
     * 9.1830E-4, 2.7540E-9, 1.1681E-2,-3.5856E-8,-3.2700E-3, 2.6077E-8,INPU1296 *COR
     * 7.9007E-3, 7.0875E-3, 6.3162E-3, 8.3619E-9, 7.9272E-3, 6.4265E-3,INPU1297 *COR
     * 2.6448E-2, 7.5265E-3, 1.6795E-2, 1.6077E-2, 1.4481E-2, 1.4015E-2,INPU1298 *COR
     * 2.0181E-2, 4.5369E-3, 3.6115E-2,-4.3586E-7, 3.5619E-3, 3.0396E-3,INPU1299 *COR
     * 3.5052E-2, 1.8626E-8, 7.2511E-3, 9.6566E-3, 3.1133E-3, 4.6023E-3,INPU1300 *COR
     * 1.7185E-2,-4.9290E-3, 4.1026E-2,-1.8885E-2, 1.2609E-2,-6.0536E-8,INPU1301 *COR
     * 9.3034E-3,-1.8283E-5, 1.4124E-2, 3.1587E-3, 1.1492E-2, 3.1862E-3,INPU1302 *COR
     *-4.0599E-4, 8.8653E-4, 8.8418E-4, 1.1652E-3, 7.4406E-3, 1.0431E-7/INPU1303 *COR
      DATA (REX(I),I=1,108)/                                                    *COR
     *-7.5453E+5,-2.3397E+4, 6.1092E+4,-1.8686E+6,-3.0537E+5,-4.8199E+6,INPU1305 *COR
     *-2.6202E+5,-1.5517E+5,-5.5664E+5, 1.3133E+4,-9.0356E+5,-3.8598E+6,INPU1306 *COR
     *-1.3630E+5,-9.6431E+5, 2.4080E+4,-2.5924E+6, 2.2087E+4,-1.7820E+6,INPU1307 *COR
     * 1.8767E+5, 2.4237E+5,-4.4592E+5,-2.7025E+6,-1.1239E+6,-9.2316E+5,INPU1308 *COR
     *-1.5237E+6,-1.2764E+6, 2.3393E+4, 4.2753E+6,-1.5010E+5,-1.2884E+5,       *COR
     *-5.5823E+4, 7.4694E+6,-2.5916E+5,-2.2401E+5,-4.8925E+5,-4.0093E+5,INPU1311 *COR
     *-3.3256E+5,-2.7931E+5,-1.5081E+5,-1.4502E+5,-3.8557E+5,-3.3371E+5,INPU1312 *COR
     *-2.8367E+5,-2.5430E+5,-1.6192E+5,-2.5325E+4,-4.9024E+5,-3.9996E+5,INPU1313 *COR
     *-3.6152E+5,-2.7984E+5,-5.9318E+5,-4.7049E+5,-3.0152E+5,-1.7189E+5,INPU1314 *COR
     *-9.2207E+5,-6.1044E+5,-8.1729E+5,-2.1306E+6,-1.9755E+5,-1.4604E+5,INPU1315 *COR
     *-4.9078E+4, 5.8488E+5,-6.1080E+5,-5.5656E+5,-3.7134E+5,-2.8505E+5,INPU1316 *COR
     *-9.4781E+5,-7.0767E+5, 3.9783E+3, 1.5432E+6,-1.7425E+5,-1.3841E+5,INPU1317 *COR
     *-5.0053E+5,-3.4550E+5,-8.9623E+5,-6.2244E+5,-5.2422E+5,-3.9295E+5,INPU1318 *COR
     *-3.6968E+5,-2.8292E+5,-7.2949E+5,-5.2546E+5,-6.0225E+5,-4.6570E+5,INPU1319 *COR
     *-2.8742E+5,-1.5837E+5,-6.6952E+5,-4.9200E+5,-6.0339E+5,-3.7899E+5,INPU1320 *COR
     *-1.0456E+6,-7.0136E+5,-2.4292E+5,-3.9819E+5,-7.9721E+5,-7.8006E+5,INPU1321 *COR
     *-1.0900E+6,-2.7675E+6,-7.5323E+5,-1.3506E+6,-1.5903E+6,-2.3962E+6,INPU1322 *COR
     *-1.2396E+6,-2.8809E+6,-2.0825E+6,-5.0075E+6,-2.6408E+5,-2.1633E+6/INPU1323 *COR
      DATA (REX(I),I=109,222)/                                                  *COR
     *-2.8543E+5, 2.7500E+6,-2.2966E+5,-1.5702E+5,-9.7323E+5,-8.1497E+5,INPU1325 *COR
     *-3.7939E+6,-4.3486E+6,-8.9927E+5,-7.5324E+5,-1.2457E+6,-1.0443E+6,INPU1326 *COR
     *-2.3061E+6,-1.7075E+6,-2.9596E+6,-2.0141E+6,-3.7641E+5,-7.8884E+6,INPU1327 *COR
     *-5.1282E+6,-9.3543E+6,-7.4612E+6,-7.2422E+6,-1.2339E+7,-1.2056E+7,INPU1328 *COR
     * 2.3229E+4, 1.4016E+7,-6.9566E+5,-4.7298E+5,-1.7104E+5, 1.5106E+6,INPU1329 *COR
     *-3.9923E+5,-2.7519E+5,-3.2309E+5,-2.3590E+5,-2.6939E+5,-1.5799E+5,INPU1330 *COR
     *-4.9727E+5,-3.3772E+5,-2.8085E+5,-2.4572E+5,-5.8394E+5,-2.2045E+6,INPU1331 *COR
     *-1.1207E+6,-7.8758E+5,-1.2869E+6,-3.4992E+6,-2.9400E+5,-1.6583E+5,INPU1332 *COR
     *-4.5954E+5,-4.0189E+5,-1.0619E+6,-7.0046E+5,-2.3217E+6,-1.4808E+6,INPU1333 *COR
     *-2.9253E+6,-2.0856E+6,-3.7585E+6,-2.6969E+6,-4.6562E+6,-3.3910E+6,INPU1334 *COR
     *-1.6167E+5, 2.0250E+6,-9.3953E+5,-7.0909E+5,-1.2558E+6,-9.1340E+5,INPU1335 *COR
     *-4.8370E+5,-5.1415E+5,-7.5237E+5,-5.7552E+5,-8.5223E+5,-6.7942E+5,INPU1336 *COR
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1366.      *-6.5952E+5,-5.6480E+5,-2.6692E+5, 1.1260E+6,-5.8892E+5,-6.1417E+5,INPU1337
1367.      *-6.1577E+5, 3.0859E+6,-1.1277E+6,-8.2686E+5,-1.0609E+6,-7.3597E+5,INPU1338
1368.      *-1.4684E+6,-1.0382E+6,-1.5722E+5, 8.3461E+5,-1.4660E+6,-1.9919E+6,INPU1339
1369.      *-1.3386E+6,-1.9095E+6,-1.1671E+6,-1.8334E+6,-1.2781E+6,-1.7678E+6,INPU1340
1370.      *-1.7235E+6,-2.1241E+6,-6.0798E+5,-3.2513E+6,-9.3816E+5,-2.5933E+6,INPU1341
1371.      *-7.2917E+5,-1.1448E+6,-7.8497E+5,-2.5867E+6,-1.7272E+6,-3.0560E+6,INPU1342
1372.      *-1.5576E+6,-2.9883E+6,-1.9268E+6,-3.0375E+6,-1.4260E+6,-2.2441E+6/INPU1343
1373.       DATA (REX(I),I=223,336)/                                          *COR
1374.      *-9.7562E+5,-3.9400E+6,-1.8171E+6,-4.0063E+6,-8.8224E+5,-2.8907E+6,INPU1345
1375.      *-1.9908E+6,-4.0020E+6,-1.1531E+6,-3.1502E+6,-1.9174E+6,-4.8745E+6,INPU1346
1376.      *-1.4391E+5,-1.4086E+7,-9.5227E+5,-6.8956E+5,-1.6537E+6,-1.1597E+6,INPU1347
1377.      *-2.3054E+6,-5.6154E+6,-3.0504E+6,-5.9776E+6,-8.7164E+5,-9.7038E+5,INPU1348
1378.      *-1.3495E+6,-1.2709E+6,-2.2963E+6,-1.0694E+7,-1.4872E+6,-1.5347E+6,INPU1349
1379.      * 3.8368E+4, 1.0919E+5,-1.5682E+5,-1.2604E+5,-5.4568E+5,-4.6902E+5,INPU1350
1380.      *-1.3175E+6,-9.5044E+5,-5.0195E+5,-4.3726E+5,-8.0664E+5,-6.5743E+5,INPU1351
1381.      *-4.3758E+5,-2.2055E+6,-1.7187E+6,-1.6436E+6,-1.1522E+5,-1.0129E+5,INPU1352
1382.      *-4.5916E+5,-3.4187E+5,-4.4067E+5,-3.2821E+5,-1.7988E+5,-1.3929E+5,INPU1353
1383.      *-5.1418E+5,-3.7707E+5,-4.2351E+4, 1.2586E+6,-1.3421E+6,-1.2794E+6,INPU1354
1384.      *-2.5425E+5,-2.4545E+5,-2.7402E+5,-2.3688E+5,-1.5678E+5, 5.7382E+6,INPU1355
1385.      *-4.7137E+5,-3.9764E+5,-9.0138E+5,-8.9810E+5,-8.0780E+5,-7.1125E+5,INPU1356
1386.      *-4.4545E+5,-4.0080E+5, 6.7590E+4, 5.1107E+4,-5.5054E+5,-2.2720E+6,INPU1357
1387.      *-1.8532E+6,-1.7348E+6,-1.9327E+5,-1.4456E+5,-4.4233E+5,-3.4593E+5,INPU1358
1388.      *-2.4128E+5,-1.5757E+5,-5.2714E+5,-3.8222E+5,-1.0280E+6,-7.7692E+5,INPU1359
1389.      *-2.2601E+5, 5.5663E+5,-1.4872E+5, 1.6766E+6,-1.7943E+6,-1.5285E+6,INPU1360
1390.      *-5.0996E+5,-4.5035E+5,-4.3492E+5,-3.4252E+5,-3.9070E+5, 5.2218E+6,INPU1361
1391.      *-1.3501E+6,-1.1920E+6,-7.8086E+5,-6.9882E+5,-8.7226E+5,-6.7694E+5,INPU1362
1392.      * 1.1896E+6, 2.5245E+2,-2.8398E+5, 1.3705E+6,-5.8873E+5,-2.3509E+6/INPU1363
1393.       DATA (REX(I),I=337,450)/                                          *COR
1394.      *-9.8893E+4,-1.3473E+6,-4.3002E+3,-1.7546E+6,-2.5449E+5, 4.0544E+6,INPU1365
1395.      *-1.4526E+6,-5.0665E+6,-8.7505E+5,-2.7345E+6,-4.1739E+5,-7.9046E+5,INPU1366
1396.      *-3.5456E+5,-2.5002E+6,-1.8727E+6,-5.8527E+6,-2.0359E+6,-1.9226E+6,INPU1367
1397.      * 5.4676E+6, 1.7736E+7,-1.5205E+5,-1.1547E+5,-1.4505E+5,-1.1448E+5,INPU1368
1398.      *-4.0176E+5,-3.5152E+4,-3.7738E+5,-2.9418E+5, 4.5604E+3, 5.6773E+6,INPU1369
1399.      *-2.7634E+5,-1.9284E+5,-7.3108E+5,-4.5391E+5,-8.4866E+4,-5.2893E+6,INPU1370
1400.      *-7.2636E+5,-6.5264E+5,-1.2458E+6,-3.3008E+5,-1.7888E+5,-1.2088E+6,INPU1371
1401.      *-1.6536E+6,-1.1840E+6, 2.9668E+4, 9.0498E+5,-2.572BE+5, 3.5603E+6,INPU1372
1402.      *-5.8903E+5,-3.5500E+5,-6.0869E+5,-4.3034E+5, 8.6210E+4,-2.1789E+6,INPU1373
1403.      *-5.3818E+5, 1.0652E+6,-1.0398E+5,-8.3945E+6,-1.0541E+6,-7.9957E+5,INPU1374
1404.      *-1.2660E+6,-1.3260E+6,-1.0227E+5, 2.6258E+6,-4.1186E+5,-3.0171E+5,INPU1375
1405.      *-6.2051E+5,-4.5747E+5,-2.2201E+6,-2.2043E+6,-1.0473E+6,-7.3497E+5,INPU1376
1406.      *-1.2623E+6,-9.2585E+5,-8.5401E+5,-7.2386E+5,-2.8059E+5,-1.6056E+5,INPU1377
1407.      *-1.5985E+6,-3.0294E+6,-2.0873E+6,-1.4945E+6,-1.3967E+5,-1.0574E+6,INPU1378
1408.      *-9.4094E+5,-6.4924E+5,-5.2908E+5,-3.8732E+5,-3.5523E+6,-2.6099E+5,INPU1379
1409.      *-3.3437E+6,-2.2876E+6,-3.6896E+6,-7.8610E+6,-1.3384E+6,-9.4744E+5,INPU1380
1410.      *-6.8763E+5,-1.1754E+6,-1.0973E+5, 2.1691E+6,-2.5652E+5,-1.6482E+5,INPU1381
1411.      *-1.0030E+6,-2.4125E+6,-8.5208E+5,-2.4934E+6,-1.5232E+6,-2.8375E+6,INPU1382
1412.      *-5.5997E+5,-4.5550E+5,-8.9151E+5,-6.4860E+5,-6.8863E+5,-5.3122E+5/INPU1383
1413.       DATA (REX(I),I=451,556)/                                          *COR
1414.      *-7.9693E+5,-2.3611E+6,-1.5804E+6,-1.2264E+6,-5.8226E+5,-1.9251E+6,INPU1385
1415.      *-2.4474E+5,-2.5180E+5,-1.6075E+6,-1.1218E+6,-1.1253E+6,-8.1434E+5,INPU1386
1416.      *-1.5545E+6,-8.2890E+5,-6.3655E+5, 1.1025E+7,-5.4678E+5,-4.4220E+5,INPU1387
1417.      *-1.0203E+6,-7.4038E+5,-9.3092E+5,-6.5560E+5,-1.2535E+6,-3.0707E+6,INPU1388
1418.      *-3.4915E+5,-1.1782E+6,-3.2625E+6,-7.1782E+6,-9.0650E+5,-7.3072E+5,INPU1389
1419.      *-1.0043E+6,-7.8609E+5,-6.6705E+5,-4.3729E+5,-9.9106E+5,-6.9513E+5,INPU1390
1420.      *-5.1403E+5,-1.0943E+6,-6.6128E+5, 8.0499E+5,-6.1301E+5,-9.9653E+5,INPU1391
1421.      *-9.1903E+5,-8.1021E+5,-9.5330E+5, 5.1599E+6,-4.3872E+5,-2.8683E+5,INPU1392
1422.      *-4.3927E+6,-3.8031E+5,-4.9505E+5,-1.3654E+7, 5.1622E+5,-1.8744E+6,INPU1393
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*COR

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1423.          +-3.9171E+5,-2.0812E+7,-5.1461E+5, 3.8616E+5,-4.8986E+5,-1.2630E+7,INPU1394
1424.          +-3.5536E+5, 1.5120E+6,-1.1195E+6,-6.5354E+5,-1.3740E+5, 2.7797E+6,INPU1395
1425.          +-5.2736E+5,-2.2654E+6,-3.9790E+5, 2.2054E+6,-6.1731E+5,-6.0140E+5,INPU1396
1426.          +-7.6941E+5,-2.1631E+6,-1.3105E+6, 9.2234E+6,-5.5405E+5,-1.6813E+7,INPU1397
1427.          +-1.6736E+6,-1.3720E+6,-3.0527E+5,-2.7048E+5,-1.3634E+5,-1.1139E+6,INPU1398
1428.          +-1.1730E+6,-8.9803E+5,-1.9450E+5,-1.4629E+5,-3.3602E+4,-3.6901E+6,INPU1399
1429.          +-2.5471E+5,-7.0141E+4,-2.3804E+5,-4.7637E+6,-7.1869E+5, 7.3957E+5,INPU1400
1430.          +-7.0131E+5,-7.7493E+5,-3.6603E+6,-6.0407E+6, 3.7120E+6, 3.7120E+6,INPU1401
1431.          +-4.9815E+6,-3.3548E+6,-1.9368E+7,-3.8385E+6/
1432.           DATA (REX(I),I=257,512)/
1433.          *-3.1153E+5,-6.4251E+5,-4.3760E+6,-4.6773E+6,-5.4510E+5,-1.7860E+5,
1434.          *-1.6195E+7,-2.0852E+6,-9.0468E+6,-5.4977E+5,-3.3559E+5, 3.7768E+6,
1435.          *-4.3065E+6, 6.9812E+5,
1436.          * 8.0408E+6, 8.0803E+0,-3.4350E+5,-1.5926E+6,-3.8643E+5,-2.1941E+5,INPU1402
1437.          *-7.4180E+5,-1.0838E+6,-4.0455E+6,-3.0246E+6,-5.5845E+5,-9.9102E+5/INPU1403
1438.           DATA (REX(I),I=513,640)/
1439.          *-7.1163E+5,-7.0230E+5,-2.5175E+5,-4.5528E+6,-1.6547E+5,-2.7330E+7,INPU1405
1440.          *-5.2413E+6,-2.6614E+1,-4.0579E+5,-7.5550E+5,-7.5974E+1,-4.4194E+1,INPU1406
1441.          *-5.2135E+5,-2.4708E+6,-5.5628E+5,-1.0869E+7,-6.7245E+5,-4.2966E+5,INPU1407
1442.          *-1.2762E+6,-1.0163E+6,-1.6348E+5,-3.5714E+6,-1.0700E+5, 3.4232E+5,INPU1408
1443.          * 9.2864E+6,-9.4536E+4,-2.3365E+6,-6.7527E+5,-1.9904E+5,-1.3110E+6,INPU1409
1444.          *-2.5435E+5, 1.5416E+5, 2.7220E+5, 3.0000E+0,-1.1665E+5, 2.0460E+3,INPU1410
1445.          *-3.5513E+5,-2.2400E+2, 1.0220E+6, 1.2669E+5,-1.0309E+5,-6.5536E+4,INPU1411
1446.          *-4.6419E+6,-2.3554E+6,-5.2671E+5,-2.3480E+5,-2.1766E+6,-6.1440E+3,INPU1412
1447.          *-2.2447E+6,-2.0480E+3,-3.0650E+4, 7.5920E+4,-1.0577E+5, 9.6000E+1,INPU1413
1448.          *-5.1730E+5,-6.0000E+0,-8.0534E+5, 5.0000E+2,-7.6407E+5,-3.2448E+4,INPU1414
1449.          *-8.0764E+6, 3.2000E+1,-3.4725E+5,-1.6000E+2,-8.5664E+5, 2.3000E+1,INPU1415
1450.          *-1.2338E+6,-4.8627E+5,-8.4740E+5, 5.0000E+1,-1.1042E+5,-5.7520E+6,INPU1416
1451.          *-2.0532E+6, 2.8593E+6,-2.4875E+6, 6.5076E+5,-3.9563E+5,-3.1940E+5,INPU1417
1452.          *-2.1546E+6,-9.5801E+5, 1.5061E+6,-5.7200E+2,-1.5962E+5,-2.0430E+6,INPU1418
1453.          *-3.8550E+6, 2.0000E+1,-5.3065E+6, 7.5376E+6,-6.2035E+5, 2.8575E+5,INPU1419
1454.          *-1.4527E+6,-1.1410E+7,-5.5270E+6,-3.2108E+7,-7.2469E+4,-7.5000E+1,INPU1420
1455.          *-6.2501E+6,-1.5165E+6,-1.8798E+6,-6.7225E+6,-5.1576E+5,-4.4040E+6,INPU1421
1456.          *-1.4614E+6,-9.6598E+5,-1.1757E+6,-2.6823E+6,-2.2771E+6, 5.1200E+2/INPU1422
1457.           DATA (REX(I),I=641,768)/
1458.          * 7.5485E+1, 7.9058E+1, 8.0866E+1, 8.0863E+1, 6.8442E+1, 6.8436E+1,INPU1424
1459.          * 6.8332E+1, 6.5476E+1, 1.2142E+1, 1.2132E+1, 8.5052E+1, 8.4992E+1,INPU1425
1460.          * 8.2398E+1, 6.9272E+1, 5.8719E+1, 5.8701E+1, 4.9279E+1, 4.9287E+1,INPU1426
1461.          * 6.8575E+1, 6.4561E+1, 6.1271E+1, 6.1248E+1, 3.4936E+1, 3.4906E+1,INPU1427
1462.          * 1.0316E+2, 1.0315E+2, 5.0858E+1, 5.0841E+1, 7.3496E+1, 7.3495E+1,
1463.          * 7.5015E+1, 7.3004E+1, 9.4086E+1, 9.4085E+1, 1.1443E+2, 1.1443E+2,INPU1430
1464.          * 9.2087E+1, 9.2045E+1, 1.0006E+2, 1.0006E+2, 1.1812E+2, 1.1812E+2,INPU1431
1465.          * 1.1990E+2, 1.1990E+2, 7.1795E+1, 7.1795E+1, 8.7702E+1, 8.7699E+1,INPU1432
1466.          * 9.3305E+1, 9.4502E+1, 1.0875E+2, 1.0875E+2, 6.8843E+1, 6.8833E+1,INPU1433
1467.          * 8.8376E+1, 8.8361E+1, 9.9014E+1, 9.8984E+1, 7.0367E+1, 7.0365E+1,INPU1434
1468.          * 7.3307E+1, 7.3303E+1, 2.1124E+2, 2.1123E+2, 9.2024E+1, 9.2021E+1,INPU1435
1469.          * 1.0431E+2, 1.0430E+2, 8.8125E+1, 8.8120E+1, 7.0892E+1, 7.0881E+1,INPU1436
1470.          * 9.2892E+1, 9.2485E+1, 1.0828E+2, 1.0827E+2, 8.7576E+1, 8.7564E+1,INPU1437
1471.          * 9.5026E+1, 9.5023E+1, 1.1043E+2, 1.1043E+2, 1.1186E+2, 1.1186E+2,INPU1438
1472.          * 6.6944E+1, 6.6936E+1, 8.3661E+1, 8.3645E+1, 2.7501E+1, 8.7490E+1,INPU1439
1473.          * 1.0849E+2, 1.0838E+2, 5.9345E+1, 5.9327E+1, 7.6533E+1, 7.6501E+1,INPU1440
1474.          * 9.2556E+1, 9.2509E+1, 6.3654E+1, 6.3612E+1, 1.0463E+2, 1.0457E+2,INPU1441
1475.          * 7.6446E+1, 7.6411E+1, 1.1056E+2, 1.1047E+2, 6.9723E+1, 6.9722E+1/INPU1442
1476.           DATA (REX(I),I=769,896)/
1477.          * 6.7843E+1, 6.7828E+1, 6.7957E+1, 6.7950E+1, 1.5138E+2, 1.5137E+2,INPU1444
1478.          * 1.2575E+2, 1.2568E+2, 9.9865E+1, 9.9845E+1, 1.1552E+2, 1.1548E+2,INPU1445
1479.          * 1.4406E+2, 1.4380E+2, 1.7915E+2, 1.7910E+2, 2.0845E+2, 2.0835E+2,INPU1446
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*COR

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1480.       * 1.3865E+2, 1.8046E+2, 1.9819E+2, 1.9396E+2, 3.1670E+2, 3.1635E+2,INPU1447   *COR
1481.       * 4.4039E+1, 4.4012E+1, 6.1650E+1, 6.1627E+1, 7.1911E+1, 7.1906E+1,INPU1448   *COR
1482.       * 9.0965E+1, 9.0960E+1, 9.2843E+1, 9.2840E+1, 6.8403E+1, 6.8403E+1,INPU1449   *COR
1483.       * 8.5735E+1, 8.5716E+1, 6.0753E+1, 6.0776E+1, 7.8558E+1, 7.8525E+1,INPU1450   *COR
1484.       * 6.7706E+1, 6.7660E+1, 1.0569E+2, 1.0563E+2, 6.6153E+1, 6.6146E+1,INPU1451   *COR
1485.       * 1.6203E+2, 1.6203E+2, 9.8677E+1, 9.8662E+1, 1.2476E+2, 1.2472E+2,INPU1452   *COR
1486.       * 1.5661E+2, 1.5655E+2, 1.8436E+2, 1.8432E+2, 2.1164E+2, 2.1159E+2,INPU1453   *COR
1487.       * 7.3623E+1, 7.3624E+1, 1.0616E+2, 1.0614E+2, 1.2068E+2, 1.2067E+2,INPU1454   *COR
1488.       * 8.7653E+1, 8.7636E+1, 1.0392E+2, 1.0390E+2, 1.2891E+2, 1.2891E+2,INPU1455   *COR
1489.       * 1.3004E+2, 1.3004E+2, 7.0137E+1, 7.0130E+1, 8.3649E+1, 8.3628E+1,INPU1456   *COR
1490.       * 8.6064E+1, 8.6070E+1, 1.0063E+2, 1.0061E+2, 1.0311E+2, 1.0309E+2,INPU1457   *COR
1491.       * 1.1365E+2, 1.1363E+2, 8.2334E+1, 8.2287E+1, 1.1586E+2, 1.1582E+2,INPU1458   *COR
1492.       * 1.1954E+2, 1.1950E+2, 1.2117E+2, 1.2113E+2, 9.4506E+1, 9.4460E+1,INPU1459   *COR
1493.       * 1.0914E+2, 1.0904E+2, 7.5484E+1, 7.5466E+1, 9.3005E+1, 9.2959E+1,INPU1460   *COR
1494.       * 7.9406E+1, 7.9364E+1, 6.8992E+1, 6.8939E+1, 1.0776E+2, 1.0769E+2,INPU1461   *COR
1495.       * 1.1025E+2, 1.1013E+2, 1.0232E+2, 1.0225E+2, 8.4985E+1, 8.4916E+1/INPU1462   *COR
1496.        DATA (BFX(I),I=223,336)/                                                     *COR
1497.       * 7.9614E+1, 7.8538E+1, 9.7526E+1, 9.7435E+1, 1.6706E+2, 1.6420E+2,INPU1464   *COR
1498.       * 9.3668E+1, 9.3570E+1, 1.5640E+2, 1.5327E+2, 8.2762E+1, 8.2643E+1,INPU1465   *COR
1499.       * 6.6954E+1, 6.6961E+1, 1.0040E+2, 1.0038E+2, 1.3489E+2, 1.3486E+2,INPU1466   *COR
1500.       * 1.0154E+2, 1.0147E+2, 1.1739E+2, 1.1726E+2, 9.8598E+1, 9.8562E+1,INPU1467   *COR
1501.       * 1.1767E+2, 1.1762E+2, 2.4698E+2, 2.3556E+2, 1.3314E+2, 1.3309E+2,INPU1468   *COR
1502.       * 5.1615E+1, 5.1621E+1, 7.2134E+1, 7.2132E+1, 1.0691E+2, 1.0690E+2,INPU1469   *COR
1503.       * 1.1874E+2, 1.1872E+2, 1.1041E+2, 1.1041E+2, 1.2895E+2, 1.2894E+2,INPU1470   *COR
1504.       * 8.2862E+1, 8.2836E+1, 1.0651E+2, 1.0645E+2, 7.1250E+1, 7.1250E+1,INPU1471   *COR
1505.       * 9.0793E+1, 9.0793E+1, 9.2562E+1, 9.2549E+1, 7.4095E+1, 7.4094E+1,INPU1472   *COR
1506.       * 9.1142E+1, 9.1136E+1, 7.7478E+1, 7.7475E+1, 1.1839E+2, 1.1835E+2,INPU1473   *COR
1507.       * 1.1387E+2, 1.1347E+2, 9.4637E+1, 9.4636E+1, 9.8560E+1, 9.8550E+1,INPU1474   *COR
1508.       * 1.3734E+2, 1.3734E+2, 1.2928E+2, 1.2827E+2, 1.4921E+2, 1.4921E+2,INPU1475   *COR
1509.       * 1.3625E+2, 1.3625E+2, 4.9790E+1, 4.9791E+1, 7.9406E+1, 7.9375E+1,INPU1476   *COR
1510.       * 1.0248E+2, 1.0284E+2, 6.7782E+1, 6.7780E+1, 8.8452E+1, 8.8449E+1,INPU1477   *COR
1511.       * 7.0976E+1, 7.0977E+1, 8.7830E+1, 8.7816E+1, 1.2134E+2, 1.2133E+2,INPU1478   *COR
1512.       * 7.1519E+1, 7.1519E+1, 7.3963E+1, 7.3958E+1, 1.0961E+2, 1.0957E+2,INPU1479   *COR
1513.       * 1.0487E+2, 1.0487E+2, 8.8833E+1, 8.8830E+1, 9.1219E+1, 9.1212E+1,INPU1480   *COR
1514.       * 1.1704E+2, 1.1704E+2, 1.4507E+2, 1.4507E+2, 1.0335E+2, 1.0334E+2,INPU1481   *COR
1515.       * 3.8863E+1, 3.8863E+1, 6.0256E+1, 6.0247E+1, 7.7826E+1, 7.7799E+1/INPU1482   *COR
1516.        DATA (BFX(I),I=337,450)/                                                     *COR
1517.       * 6.0958E+1, 6.0936E+1, 6.1384E+1, 6.1363E+1, 6.5956E+1, 6.5935E+1,INPU1484   *COR
1518.       * 1.2263E+2, 1.2257E+2, 7.0228E+1, 7.0177E+1, 9.0130E+1, 8.9765E+1,INPU1485   *COR
1519.       * 7.6996E+1, 7.6930E+1, 1.0825E+2, 1.0814E+2, 9.2543E+1, 9.2468E+1,INPU1486   *COR
1520.       * 4.4560E+1, 4.4641E+1, 7.0199E+1, 7.0196E+1, 7.0616E+1, 7.0615E+1,INPU1487   *COR
1521.       * 6.8349E+1, 6.8349E+1, 8.7053E+1, 8.7050E+1, 4.8092E+1, 4.8087E+1,INPU1488   *COR
1522.       * 6.8867E+1, 6.8854E+1, 8.4819E+1, 8.4802E+1, 7.1962E+1, 7.1948E+1,INPU1489   *COR
1523.       * 8.1623E+1, 8.1601E+1, 1.2326E+2, 1.2323E+2, 1.3496E+2, 1.3492E+2,INPU1490   *COR
1524.       * 1.5674E+2, 1.5672E+2, 5.0093E+1, 5.0095E+1, 6.9754E+1, 6.9742E+1,INPU1491   *COR
1525.       * 8.5625E+1, 8.5616E+1, 8.6101E+1, 8.6094E+1, 5.1993E+1, 5.1990E+1,INPU1492   *COR
1526.       * 7.7469E+1, 7.7490E+1, 9.7574E+1, 9.7607E+1, 1.2564E+2, 1.2563E+2,INPU1493   *COR
1527.       * 9.4966E+1, 9.4932E+1, 1.0398E+2, 1.0397E+2, 9.2680E+1, 9.2667E+1,INPU1494   *COR
1528.       * 8.7342E+1, 8.7326E+1, 1.6685E+2, 1.6583E+2, 1.0156E+2, 1.0154E+2,INPU1495   *COR
1529.       * 9.8745E+1, 9.8707E+1, 1.4718E+2, 1.4717E+2, 6.8973E+1, 6.8967E+1,INPU1496   *COR
1530.       * 1.1113E+2, 1.1109E+2, 1.5228E+2, 1.5224E+2, 1.1556E+2, 1.1554E+2,INPU1497   *COR
1531.       * 1.0509E+2, 1.0508E+2, 8.8877E+1, 8.8872E+1, 1.6613E+2, 1.6604E+2,INPU1498   *COR
1532.       * 1.7259E+2, 1.7254E+2, 1.5752E+2, 1.5741E+2, 1.2164E+2, 1.2162E+2,INPU1499   *COR
1533.       * 7.8431E+1, 7.8398E+1, 8.5753E+1, 8.5743E+1, 6.9299E+1, 6.9295E+1,INPU1500   *COR
1534.       * 9.6265E+1, 9.6247E+1, 9.6340E+1, 9.6303E+1, 1.1091E+2, 1.1087E+2,INPU1501   *COR
1535.       * 8.2945E+1, 8.2933E+1, 1.0556E+2, 1.0555E+2, 1.0952E+2, 1.0951E+2/INPU1502   *COR
1536.        DATA (BFX(I),I=451,556)/                                                     *COR
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1537.       * 7.8170E+1, 7.8137E+1, 1.3662E+2, 1.3660E+2, 8.0021E+1, 7.9991E+1,INPU1504   *COR
1538.       * 1.0984E+2, 1.0984E+2, 1.3752E+2, 1.3750E+2, 9.9914E+1, 9.9902E+1,INPU1505   *COR
1539.       * 1.3925E+2, 1.3923E+2, 9.5725E+1, 9.5639E+1, 1.1378E+2, 1.1377E+2,INPU1506   *COR
1540.       * 1.0203E+2, 1.0201E+2, 1.0306E+2, 1.0304E+2, 8.5194E+1, 8.5129E+1,INPU1507   *COR
1541.       * 1.0286E+2, 1.0284E+2, 1.7982E+2, 1.7969E+2, 1.0442E+2, 1.0440E+2,INPU1508   *COR
1542.       * 1.0285E+2, 1.0284E+2, 8.2137E+1, 8.2120E+1, 1.2523E+2, 1.2522E+2,INPU1509   *COR
1543.       * 8.4611E+1, 8.4585E+1, 8.4446E+1, 8.4432E+1, 8.649AE+1, 8.6458E+1,INPU1510   *COR
1544.       * 1.4261E+2, 1.4261E+2, 5.9151E+1, 5.9130E+1, 9.1326E+1, 9.1318E+1,INPU1511   *COR
1545.       * 8.8165E+1, 8.8158E+1, 7.7346E+1, 7.7340E+1, 7.3827E+1, 7.3825E+1,INPU1512   *COR
1546.       * 8.9481E+1, 8.9466E+1, 8.6637E+1, 8.6629E+1, 8.7582E+1, 8.7647E+1,INPU1513   *COR
1547.       * 9.3694E+1, 9.3688E+1, 1.4892E+2, 1.4891E+2, 1.8975E+2, 1.8973E+2,INPU1514   *COR
1548.       * 9.4696E+1, 9.4653E+1, 9.0889E+1, 9.0863E+1, 1.0857E+2, 1.0855E+2,INPU1515   *COR
1549.       * 9.7807E+1, 9.7769E+1, 8.5112E+1, 8.5056E+1, 7.9301E+1, 7.9322E+1,INPU1516   *COR
1550.       * 1.3404E+2, 1.3401E+2, 1.2037E+2, 1.2037E+2, 1.8589E+2, 1.8588E+2,INPU1517   *COR
1551.       * 1.1923E+2, 1.1921E+2, 6.8573E+1, 6.8571E+1, 7.3749E+1, 7.3763E+1,INPU1518   *COR
1552.       * 6.3790E+1, 6.3772E+1, 6.7971E+1, 6.7975E+1, 8.5030E+1, 8.5009E+1,INPU1519   *COR
1553.       * 8.3960E+1, 8.3943E+1, 1.5084E+2, 1.5084E+2, 4.8462E+1, 4.8462E+1,INPU1520   *COR
1554.       * 9.6515E+1, 9.6515E+1, 1.1945E+2, 1.1945E+2/                               *COR
1555.        DATA (RFX(I),I=557,582)/                                                   *COR
1556.       * 9.2882E+1, 9.2882E+1, 1.0467E+2, 1.0467E+2, 1.1360E+2, 1.1360E+2,        *COR
1557.       * 1.2029E+2, 1.2029E+2, 1.4176E+2, 1.4176E+2, 1.1317E+2, 1.1317E+2,        *COR
1558.       * 1.1931E+2, 1.1931E+2,                                                    *COR
1559.       * 4.1596E+1, 4.1596E+1, 8.3076E+1, 8.2669E+1, 2.2015E+2, 2.2231E+2,INPU1521   *COR
1560.       * 5.4989E+1, 5.4822E+1, 1.5160E+2, 1.4559E+2, 2.9255E+1, 2.9207E+1/INPU1522   *COR
1561.        DATA (RFX(I),I=583,690)/                                                   *COR
1562.       * 7.2826E+1, 7.2638E+1, 1.1607E+2, 1.0529E+2, 2.1518E+2, 2.0282E+2,INPU1524   *COR
1563.       * 1.2813E+2, 1.2813E+2, 8.8543E+1, 8.7005E+1, 1.1059E+2, 1.1059E+2,INPU1525   *COR
1564.       * 7.8772E+1, 7.1452E+1, 6.8213E+1, 6.7766E+1, 2.9859E+1, 2.9915E+1,INPU1526   *COR
1565.       * 1.2829E+2, 1.2830E+2, 1.1483E+2, 1.1440E+2, 2.5834E+1, 2.5668E+1,INPU1527   *COR
1566.       * 2.4230E+1, 2.4236E+1, 7.8085E+1, 7.5953E+1, 1.1284E+2, 1.1062E+2,INPU1528   *COR
1567.       * 1.0427E+2, 1.0444E+2, 2.8747E+1, 2.5938E+1, 7.862BE+1, 9.0875E+1,INPU1529   *COR
1568.       * 1.4504E+1, 1.6620E+1, 1.1345E+2, 8.2051E+1, 6.8180E+1, 7.6762E+1,INPU1530   *COR
1569.       * 1.8018E+1, 1.8432E+1, 2.9344E+1, 3.4760E+1, 4.3107E+1, 5.0250E+1,INPU1531   *COR
1570.       * 7.0635E+1, 6.3305E+1, 5.1462E+1, 5.0233E+1, 4.2744E+1, 4.5685E+1,INPU1532   *COR
1571.       * 6.1670E+1, 5.9465E+1, 5.6128E+1, 6.2633E+1, 4.7040E+1, 4.9611E+1,INPU1533   *COR
1572.       * 1.9109E+1, 2.5633E+1, 7.5236E+1, 8.0552E+1, 5.6904E+1, 8.0446E+1,INPU1534   *COR
1573.       * 6.0897E+1, 6.3138E+1, 1.0288E+2, 1.0441E+2, 1.1199E+2, 1.1193E+2,INPU1535   *COR
1574.       * 2.0692E+2, 2.4994E+2, 2.6722E+2, 2.6363E+2, 3.3754E+2, 3.3695E+2,INPU1536   *COR
1575.       * 1.6038E+2, 1.5120E+2, 1.4281E+2, 1.2088E+2, 9.7955E+1, 9.7777E+1,INPU1537   *COR
1576.       * 1.7563E+2, 1.5717E+2, 3.3667E+2, 3.3646E+2, 1.6765E+2, 1.6763E+2,INPU1538   *COR
1577.       * 1.7652E+2, 1.6311E+2, 3.3655E+2, 3.0192E+2, 4.7046E+1, 3.9714E+1,INPU1539   *COR
1578.       * 6.5637E+1, 5.7682E+1, 1.1247E+2, 1.0600E+2, 1.9140E+2, 1.8342E+2,INPU1540   *COR
1579.       * 7.8284E+1, 7.9020E+1, 8.3588E+1, 8.3470E+1, 1.5665E+2, 1.6186E+2/INPU1541   *COR
1580.        DATA (TUX(I),I=1,165)/                                                     *COR
1581.       * 2500.., 6000.., 2500.., 6000.., 2500.., 6000.., 2500.., 6000., 2500..    INPU1543   *COR
1582.       * 6000.., 2500.., 6000.., 2500.., 6000.., 2500.., 6000., 2500., 6000..     INPU1544   *COR
1583.       * 2500.., 6000.., 2500..,                                                  *COR
1584.       * 6000.., 2500.., 6000.., 2500.., 6000.., 2500.., 6000., 2500., 6000..     INPU1546   *COR
1585.       * 2500.., 6000.., 2500.., 6000.., 2500.., 6000.., 2500., 6000., 2500..     INPU1547   *COR
1586.       * 6000.., 2500.., 6000.., 2500.., 6000.., 2500.., 6000., 2500., 6000..     INPU1548   *COR
1587.       * 2500.., 6000.., 2500.., 6000.., 2500.., 6000.., 2500., 6000., 2500..     INPU1549   *COR
1588.       * 6000.., 2500.., 6000.., 2500.., 6000.., 2500.., 6000., 2500., 6000..     INPU1550   *COR
1589.       * 2500.., 6000.., 2500.., 6000.., 2500.., 6000.., 2500., 6000., 2500..     INPU1551   *COR
1590.       * 6000.., 2500.., 6000.., 2500.., 6000.., 2500.., 6000., 2500., 6000..     INPU1552   *COR
1591.       * 2500.., 6000.., 2500.., 6000.., 2500.., 6000.., 2500., 6000., 2500..     INPU1553   *COR
1592.       * 6000.., 2500.., 6000.., 2500.., 6000.., 2500.., 6000., 2500., 6000..     INPU1554   *COR
1593.       * 2500.., 6000.., 2500.., 6000.., 2500.., 6000.., 2500., 6000., 2500..     INPU1555   *COR
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     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,    INPU1556    *COR
     *  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,    INPU1557    *COR
     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,    INPU1558    *COR
     *  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,    INPU1559    *COR
     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,    INPU1560    *COR
     *  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500./    INPU1561    *COR
      DATA (TUX(I),I=166,336)/                                                                 *COR
     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,    INPU1563    *COR
     *  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,    INPU1564    *COR
     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,    INPU1565    *COR
     *  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,    INPU1566    *COR
     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,    INPU1567    *COR
     *  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,    INPU1568    *COR
     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  1000.,  1500.,    INPU1569    *COR
     *  2500.,  6000.,  1000.,  1500.,  2500.,  6000.,  2500.,  6000.,  2500.,    INPU1570    *COR
     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,    INPU1571    *COR
     *  2500.,  6000.,  1000.,  1500.,  2500.,  6000.,  2500.,  6000.,  2500.,    INPU1572    *COR
     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,    INPU1573    *COR
     *  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,    INPU1574    *COR
     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,    INPU1575    *COR
     *  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,    INPU1576    *COR
     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,    INPU1577    *COR
     *  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,    INPU1578    *COR
     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,    INPU1579    *COR
     *  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,    INPU1580    *COR
     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000./    INPU1581    *COR
      DATA (TUX(I),I=337,507)/                                                                 *COR
     *  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,    INPU1583    *COR
     *  6000.,  1000.,  1500.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,    INPU1584    *COR
     *  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,    INPU1585    *COR
     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,    INPU1586    *COR
     *  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,    INPU1587    *COR
     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,    INPU1588    *COR
     *  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,    INPU1589    *COR
     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,    INPU1590    *COR
     *  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,    INPU1591    *COR
     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,    INPU1592    *COR
     *  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,    INPU1593    *COR
     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,    INPU1594    *COR
     *  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,    INPU1595    *COR
     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,    INPU1596    *COR
     *  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,    INPU1597    *COR
     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,    INPU1598    *COR
     *  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,    INPU1599    *COR
     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,    INPU1600    *COR
     *  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500./    INPU1601    *COR
      DATA (TUX(I),I=508,570)/                                                                 *COR
     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,    INPU1603    *COR
     *  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,    INPU1604    *COR
     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,    INPU1605    *COR
     *  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,    INPU1606    *COR
     *  6000.,  2500.,  6000.,  2500.,  6000.,  2500.,  6000.,10000.,10000.,    INPU1607    *COR
     *  3000.,  5000.,  3000.,  5000.,  3000.,  5000.,  3000.,  5000.,  3000.,                *COR
     *  5000.,  3000.,  5000.,  3000.,  5000.,  3000.,  5000.,  3000.,  5000./                *COR
      DATA (TUX(I),I=571,690)/                                                                 *COR
     *  3000.,  5000.,  1200.,  2000.,  1000.,  1600.,  1700.,  3000.,  1200.,    INPU1609    *COR
     *  2000.,  2200.,  4000.,  1200.,  2000.,  1000.,  1500.,  1000.,  1500.,    INPU1609    *COR
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      * 1000.. 1500..  700.. 1000.. 1000.. 1500.. 1500.. 2500.. 1700..    INPU1610                *COR
      * 3000.. 1700.. 3000.. 1700.. 3000.. 1700.. 3000.. 2000.. 3500..    INPU1611                *COR
      * 2200.. 4000.. 1300.. 2200.. 1700.. 3000.. 1700.. 3000..  934..    INPU1612                *COR
      * 4000.. 2316.. 3500.. 2456.. 5000..  722.. 4000.. 2743.. 4500..    INPU1613                *COR
      * 1556.. 6000.. 2518.. 6000.. 2400.. 3500.. 2474.. 4000..  883..    INPU1614                *COR
      * 2000.. 1121.. 3000..  744.. 3500.. 1457.. 4000.. 1695.. 4500..    INPU1615                *COR
      * 1685.. 4500.. 1116.. 4000..  479.. 2000..  824.. 2000.. 1474..    INPU1616                *COR
      * 4000.. 1700.. 3000.. 1190.. 3000.. 1200.. 2000.. 1200.. 2000..    INPU1617                *COR
      * 1000.. 1500..  993.. 2000.. 1900.. 1500..  745.. 2000.. 1700..    INPU1618                *COR
      * 3000.. 1700.. 3000.. 1000.. 1500.. 1000.. 1500..  962.. 2000..    INPU1619                *COR
      * 1000.. 1500.. 1000.. 1500.. 1000.. 1500.. 1200.. 2000.. 1200..    INPU1620                *COR
      * 2000.. 1307.. 3000./                                              INPU1621                *COR
       DATA    (KPMAX(I),I=1,639)/                                                               *COR
      *   8 * 1 , 2 * 2 , 562 * 1 , 16 * 2 , 2 * 3 , 2 * 2, 2 * 3, 12 *2,                       *COR
      *3,3,2,2,2,2,2,2,2,3,2,3,2,3,2,3,2,3,2,3,2,3,2,3,2,3,2,3,2,3,2,3,2/INPU1644                *COR
       DATA (KPMAX(I),I=640,690)/                                                                *COR
      *3,2,3,2,3,2,3,2,3,2,3,2,3,2,3,2,2,2,3,2,2,2,2,2,2,2,3,2,2,2,3,2,2,2,2,INPU1646           *COR
      *2,2,3,3,2,3,2,2,2,2,3,3,2,2,2,2,3/                                                        INPU1647                *COR
       DATA CHAP,BLANK/4HCHAP,4H    /                                                            INPU1656                *-63
       J=ISP                                                                                     INPU1657
       IF (I1) 5,5,10                                                                            INPU1658
5      CONTINUE                                                                                  INPU1659
       NJAN=0                                                                                    INPU1660
       REFF=26.7                                                                                                         *COR
       EFA=.489                                                                                                          *COR
       NFF=0                                                                                     INPU1663                **-2
       JC=KR(3)-(KR(3) / 2)*2                                                                    INPU1664
       VINT=P*1.E-6                                                                              INPU1665
       YINT=ALOG(VINT)                                                                           INPU1666
       JAT(8)=0                                                                                  INPU1667
       N=0                                                                                       INPU1668
       II=ISP                                                                                    INPU1669
       J=1                                                                                       INPU1670
       IFL=-1                                                                                    INPU1671
       IDC=1                                                                                     INPU1672
10     IF (KR(3) - 5) 15,60,60                                                                   INPU1673
15     IF (KRK(3)) 45,20,45                                                                      INPU1674
20     NJAN=NJAN+1                                                                               INPU1675
       IF (NJAN.GT.345) GO TO 365                                                                                        *COR
       DO 25 I=1,7                                                                               INPU1677                **-1
       ALPT(I)=ALPTD(I,NJAN)                                                                     INPU1678
       JAT(I)=JATD(I,NJAN)                                                                       INPU1679
25     SORCE(I)=SORCD(I,NJAN)                                                                    INPU1680
       SORCE(8)=SORCD(8,NJAN)                                                                    INPU1681
       AMOA=AMOAD(NJAN)                                                                          INPU1682
       AMOB=AMORD(NJAN)                                                                          INPU1683
       GO TO 50                                                                                  INPU1696                *-12
45     READ (KIN,405) (ALPT(K),JAT(K),K=1,7),SORCE,AMOA,AMOB                                     INPU1697
50     IF (KR(3)-3) 75,55,55                                                                     INPU1698
55     WRITE (JAN)  ALPT,JAT,SORCE,AMOA,AMOB                                                     INPU1699
       GO TO 75                                                                                  INPU1700
60     READ (JAN)  ALPT,JAT,SORCE,AMOA,AMOB                                                      INPU1701
       NJAN=1                                                                                    INPU1708                **-6
75     IF (ALPT(1)) 80,385,80                                                                    INPU1709
80     IF (JAT(1)) 85,85,105                                                                     INPU1710
85     INF=NFF+1                                                                                 INPU1711
       K=ABS(ALPT(1))                                                                            INPU1712
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1708.           NFF=K+NFF                                                       INPU1713
1709.           IF (KK(3) - 5) 90,100,100                                       INPU1714
1710.     90    READ (KIN,400) (NFIA(I),NFIB(I),FFIN(I),I=INF,NFF)              INPU1715
1711.           IF (KK(3) - 3) 10,95,95                                         INPU1716
1712.     95    WRITE (JAN)  (NFIA(I) ,NFIB(I) ,FFIN(I) ,I = INF,NFF)           INPU1717
1713.           GO TO 10                                                        INPU1718
1714.    100    READ (JAN)  (NFIA(I) ,NFIB(I) ,FFIN(I) ,I = INF,NFF)            INPU1719
1715.           GO TO 10                                                        INPU1720
1716.    105    DO 110 K=1,IS                                                   INPU1721
1717.    110    C(K)=0.                                                         INPU1722
1718.           DO 130 I=1,7                                                    INPU1723
1719.           IF (JAT(I)) 115,130,115                                         INPU1724
1720.    115    DO 120 K=1,IS                                                   INPU1725
1721.           IF (JAT(I) - KAT(K)) 120,125,120                                INPU1726
1722.    120    CONTINUE                                                        INPU1727
1723.           KK=11                                                           INPU1728
1724.           GO TO 255                                                       INPU1729
1725.    125    C(K)=ALPT(I)                                                    INPU1730
1726.    130    CONTINUE                                                        INPU1731
1727.           WT=0.                                                           INPU1732
1728.           IF (JC) 140,135,140                                             INPU1733
1729.    135    WRITE (KOUT,405) (ALPT(K),JAT(K),K=1,7),SORCE,AMOA,AMOB         INPU1734
1730.    140    I=1                                                             INPU1735
1731.           LAMKK=0                                                         INPU1736
1732.           DO 155 I=1,IS                                                   INPU1737
1733.           IF (C(I)) 145,150,145                                           INPU1738
1734.    145    LAMKK=LAMKK+1                                                   INPU1739
1735.    150    I=I+1                                                           INPU1740
1736.           ALPT(I)=C(I)                                                    INPU1741
1737.    155    WT=WT+C(I)*WAT(I)                                               INPU1742
1738.           IF (J - IS) 160,160,220                                         INPU1743
1739.    160    JM=J-1                                                          INPU1744
1740.           IF (JM) 180,190,165                                             INPU1745
1741.    165    DO 185 L=1,JM                                                   INPU1746
1742.           IML=IM(L)                                                       INPU1747
1743.           UGH=C(IML)                                                      INPU1748
1744.           UM(L,J)=0.                                                      INPU1749
1745.           IF (UGH) 170,185,170                                            INPU1750
1746.    170    DO 175 I=1,L                                                    INPU1751
1747.    175    UM(I,J)=UM(I,J)-UM(I,L)*UGH                                     INPU1752
1748.           DO 180 I=IML,IS                                                 INPU1753
1749.    180    C(I)=C(I)-TAU(I,L)*UGH                                          INPU1754
1750.    185    UM(J,L)=0.                                                      INPU1755
1751.    190    DO 195 I=1,IS                                                   INPU1756
1752.           IF (ABS(C(I)) - .001) 195,195,200                               INPU1757
1753.    195    TAU(I,J)=0.                                                     INPU1758
1754.           GO TO 220                                                       INPU1759
1755.    200    IM(J)=I                                                         INPU1760
1756.           UM(J,J)=1.                                                      INPU1761
1757.           DO 205 L=1,J                                                    INPU1762
1758.    205    UM(L,J)=UM(L,J)/C(I)                                            INPU1763
1759.           DO 210 L=1,IS                                                   INPU1764
1760.    210    TAU(L,J)=C(L)/C(I)                                              INPU1765
1761.           YC=YINT                                                         INPU1766
1762.           DO 215 L=1,IS                                                   INPU1767
1763.    215    CTJ(J,L)=ALPT(L)                                                INPU1768
1764.           KK=J                                                            INPU1769
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1765.            KKK=J                                                          INPU1770
1766.            J=J+1                                                          INPU1771
1767.            GO TO 255                                                      INPU1772
1768.      230   CONTINUE                                                       INPU1773
1769.            IF (J - IS) 225,225,200                                        INPU1774
1770.      235   DO 240 I=1,JM                                                  INPU1775
1771.      240   VBU(II,I)=-UM(I,J)                                             INPU1776
1772.            DO 235 I=J,IS                                                  INPU1777
1773.      235   VBU(II,I)=0.                                                   INPU1778
1774.            GO TO 250                                                      INPU1779
1775.      240   DO 245 L=1,IS                                                  INPU1780
1776.            VBU(II,L)=0.                                                   INPU1781
1777.            DO 245 I=1,IS                                                  INPU1782
1778.      245   VBU(II,L)=VBU(II,L)+C(I)*UM(L,I)                               INPU1783
1779.      250   KK=II                                                          INPU1784
1780.            KKK=II                                                         INPU1785
1781.            II=II+1                                                        INPU1786
1782.            YC=0.                                                          INPU1787
1783.      255   IF (KK(3) - 5) 260,290,290                                     INPU1788
1784.      260   IF (KKK(3)) 275,265,275                                        INPU1789
1785.      265   DO 270 K=1,2                                                   INPU1790
1786.            RA(K)=RAD(K,NJAN)                                              INPU1791
1787.            RD(KK,K)=RBD(K,NJAN)                                           INPU1792
1788.            RC(KK,K)=RCD(K,NJAN)                                           INPU1793
1789.            RD(KK,K)=RDD(K,NJAN)                                           INPU1794
1790.            RE(KK,K)=RED(K,NJAN)                                           INPU1795
1791.            RF(KK,K)=RFD(K,NJAN)                                           INPU1796
1792.            TU(KK,K)=TUD(K,NJAN)                                           INPU1797
1793.      270   KPHA(K)=KPHAD(K,NJAN)                                          INPU1798
1794.            GO TO 295                                                      INPU1799
1795.      275   READ (KTR,280) (RA(K),RB(KK,K),RC(KK,K),RD(KK,K),RE(KK,K),RF(KK,K)INPU1800
1796.           1,TU(KK,K),KPHA(K),K=1,2)                                       INPU1801
1797.      280   IF (KK(3)-3) 295,285,285                                       INPU1802
1798.      285   WRITE (JAN)  (RA(K) ,RB(KK,K) ,RC(KK,K) ,RD(KK,K) ,RE(KK,K) ,RF(KKINPU1803
1799.           1,K) ,TU(KK,K) ,KPHA(K) ,K = 1,2)                               INPU1804
1800.            GO TO 295                                                      INPU1805
1801.      290   READ (JAN)  (RA(K) ,RB(KK,K) ,RC(KK,K) ,RD(KK,K) ,RE(KK,K) ,RF(KK,INPU1806
1802.           1K) ,TU(KK,K) ,KPHA(K) ,K = 1,2)                                INPU1807
1803.      295   IF (KK - II) 300,310,300                                       INPU1808
1804.      300   IF(KK)=20000.                                                  INPU1809
1805.            IF (KPHA(1) - KPHA(2)) 305,315,310                             INPU1810
1806.      305   IF (KPHA(1) + KPHA(2) - 5) 310,320,310                         INPU1811
1807.      310   WRITE (KOUT,410) ANGA,ANGB                                     INPU1812
1808.            STOP                                                           INPU1813
1809.      315   IF (KPHA(1)-1) 310,330,325                                     INPU1814
1810.      320   TU(KK,1)=-TU(KK,1)                                             INPU1815
1811.      325   RE(KK)=1.E+10                                                  INPU1816
1812.            IFC(KKK)=-1                                                    INPU1817
1813.            VB(KK)=0.                                                      INPU1818
1814.            Y(KK)=AMAX1(YC,0.)                                             INPU1819
1815.            GO TO 345                                                      INPU1820
1816.      330   RE(KK)=(U1/REF1)**2*RE                                         INPU1821
1817.            IF (RT-.1) 335,335,340                                         INPU1822
1818.      335   RE(KK)=1.E+10                                                  INPU1823
1819.      340   IFC(KKK)=0                                                     INPU1824
1820.            VB(KK)=VINT                                                    INPU1825
1821.            Y(KK)=YINT                                                     INPU1826
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1822.      345   IF (JC) 355,350,355                                                    INPU1827
1823.      350   WRITE (KOUT,395) (RA(K),RB(KK,K),RC(KK,K),RD(KK,K),RE(KK,K),RF(KK,INPU1828
1824.           1K),TU(KA,K),KPHA(K),K=1,2),FF(KK)                                   INPU1829
1825.      355   FF(KK)=FF(KK)**(ANEX                                                 INPU1830
1826.            IF (IFC(KK)) 360,365,360                                            INPU1831
1827.      360   FF(KK)=1.0E+10                                                       INPU1832
1828.      365   FAMDA(KK)=ALPHA                                                      INPU1833
1829.            FAMDB(KK)=BETA                                                      INPU1834
1830.            IAMI(KK)=IFC(KK                                                     INPU1835
1831.            XTM(KK)=XT                                                          INPU1836
1832.            RA(KK,1)=RA(KK,1)+RA(1)                                             INPU1837
1833.            RB(KK,2)=RB(KK,2)+RA(2)                                             INPU1838
1834.            N=N+1                                                               INPU1839
1835.            IF (N-179) 375,375,370                                              INPU1840
1836.      370   NEX=N-179                                                           INPU1841
1837.            WRITE (KOUT,415) NEX                                                INPU1842
1838.            STOP                                                                INPU1843
1839.      375   CONTINUE                                                            INPU1844
1840.            IF (KK-IS) 10,380,10                                                INPU1845
1841.      380   CONTINUE                                                            INPU1846
1842.      385   VR(N+1)=0.                                                          INPU1847
1843.            TR(N+1)=0.                                                          INPU1848
1844.            IFC(N+1)=-1                                                         INPU1849
1845.            RT(N+1)=-1.                                                         INPU1850
1846.            FAMDA(N+1)=BLANK                                                    INPU1851
1847.            FAMDB(N+1)=BLANK                                                    INPU1852
1848.            RETURN                                                              INPU1853
1849.      C                                                                         INPU1854
1850.      390   FORMAT  (6F9.6,6XE6.0,I1)                                           INPU1855
1851.      395   FORMAT (1X6F12.5,F10.4,I2/1X6F12.5,F10.4,I2,F7.4)                   INPU1856
1852.      400   FORMAT (2A4,E12.4,2A4,E12.4,2A4,E12.4,2A4,E12.4)                    INPU1857
1853.      405   FORMAT ( 7(F3.0,I3),A2,9A4)                                         INPU1858
1854.      410   FORMAT  (////25H BAD PHASE BUFFERING FOR 2A4)                       INPU1859
1855.      415   FORMAT (////11H THERE ARE I2,15H EXCESS SPECIES)                    INPU1860
1856.            END                                                                 INPU1861
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      SUBROUTINE KINET                                                  KINE0001
      DIMENSION XX(20),PRMU(10,50)                                                *COR
C                                                                       KINE0003    **-1
      REAL NFIA(1),NFIB(1),FFIN(1),TAU(10,10)                           KINE0004
      EQUIVALENCE (NFIA(1),A(1)), (NFIB(1),A(51)), (FFIN(1),A(101)),    KINE0005
     1(TAU(1),A(151))                                                   KINE0006
      DIMENSION TF(180),CIJ(180,1)                                      KINE0007
      DIMENSION X(1),VLAM(180,1)                                        KINE0008
C                                                                       KINE0009
      COMMON          FAMDA(180),FAMDB(180),RB(180,2),RC(180,2),        KINE0010
     1                KD(180,2),RE(180,2),RF(180,2),TU(180,2),VN(180),  KINE0011
     2                Y(180),WTM(180),VNU(180,10),FF(180),IFC(180),     KINE0012
     3                IP(180),CP(180),H(180),SR(180),TC(180),VLNK(180), KINE0013
     4                E(180),LAMT(180),GAMK(1,1)                        KINE0014
C                                                                       KINE0015
      COMMON /PARAM1/ KIN,KOUT,JAN,MOL,NAB,IDC,N,KKX(3),KR(10),TILE(3), KINE0016
     1                TTMIN,TTMAX,VISC,PR(1)                            KINE0017
C                                                                       KINE0018
      COMMON /PARAM2/ WN,SCH,RHO,VEL,B1,AFF,FFA,TS,ISP,P,T,SIP,HIP,     KINE0019
     1                EL,ENL,FL10,NO,IFL,ISPG,KRALP,CPF,IRE,IER,AA,ITS, KINE0020
     2                IM,IL,TT,MODE,HMELT,SMELT,TMAX,TMIN,MELT,SUMN,    KINE0021
     3                SUML,JC,HG,CPG,SVA,SVB,SVC,SVD,SUMC,NXC,SA1,      KINE0022
     4                VMACH,KRZZ,SP1,GAM,THI,MX,DMCHT,HCH,NCV,TBT,      KINE0023
     5                IERZ,NOAT,SP1,IXG,SV1,KKJ,IXC,NXG,SH1,NOATO,      KINE0024
     6                SA2,FFF,WS,RV,CNF,VA,HOS,DUM1,DUM2,FP,IFCJC,      KINE0025
     7                ISP2,WTG,VMU2,WTL                                 KINE0026
C                                                                       KINE0027
      COMMON /ARRAYS/ A(16,16),P(16),W(3),XC(50),XG(50),ZKE(10),        KINE0028
     1                TLO(10),DMCLO(10),WALJP(10),FB(10),ALP(10),       KINE0029
     2                GAMH(10),GAMF(10),TO(10,3),TK(10,3),WAT(10),      KINE0030
     3                IR(10),ICAT(10),KAT(10),UN(10,10),FRL(10)         KINE0031
      EQUIVALENCE (TU(181),TF(1)), (VNU(1),CIJ(1))                      KINE0032
C                                                                       KINE0033
      COMMON /KINCTX/ MT,FKF(50),FAK(50),FXK(50),PRU(10,50),RMU(10,50), KINE0034
     1    PRR(50), PKKK(50)                                                       *COR
C                                                                       KINE0036    **-1
      EQUIVALENCE (B(1),X(1)), (GAMK(1),VLAM(1))                        KINE0037
C                                                                       KINE0038
      COMMON /DIFFER/ IF(11),DKPT(50),PKF(50),PKR(50),KAT(50),DUN(50),  KINE0039
     1                LL(50),MA(50)                                     KINE0040
C                                                                       KINE0041
      COMMON/CARKIN/ ARK(10),ROUGH,DCC                                  KINE0042
      COMMON/ZKIN/ UNR(10,50),NPP(10,50),NPE(10,50),FKKS(50),                  *COR
     *PFX(50),PST(10,50),FKK(10,50),TNP(50)                                    *COR
    5 FORMAT(1313)                                                      KINE0320    *COR
  254 IF(KR(9)-4) 334,333,255                                                    *COR
  255 IF(KR(9)-5) 334,334,331                                                    *COR
  331 KR(9)=4                                                                    *COR
      DO662 M=1,MT                                                               *COR
  662 XX(M)=FKF(M)                                                               *COR
  333 DO 603 M=1,MT                                                              *COR
      IF(IRR(M),EQ.9H) GO TO 604                                                 *COR
      PRX(M)=0.0                                                                 *COR
      FKKS(M)=0.0                                                                *COR
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```
      DO 602 J=1,3                                                                    *COR
      I=NPP(J,M)                                                                      *COR
  602 PPX(M)=PPX(M)+PSI(J,M)*VN(I)                                                    *COR
      IS1=NPF(1,M)                                                                    *COR
      IS2=NPF(2,M)                                                                    *COR
      IF(IS1.GT.0) FKFS(M)=FKF(1,M)*VN(IS1)                                           *COR
      IF(IS2.GT.0) FKFS(M)=FKF(2,M)*VN(IS2)                                           *COR
      FKKS(M)=1.0+FKKS(M)                                                             *COR
      PPX(M)=1.0+PFX(M)                                                               *COR
      FKF(M)=XX(M)/(PPX(M)*FKKS(M))                                                   *COR
      GO TO 603                                                                       *COR
  604 II=NMP(1,M)                                                                     *COR
      III=NMR(1,M)                                                                    *COR
      PFX(M)=1.0                                                                      *COR
      FKKS(M)=1.0                                                                     *COR
      FAK(M)=RMU(1,M)*H(II)-RMU(1,M)*H(III)                                           *COR
  920 FKF(M)=XX(M)/SQRT(RMU(1,M))*35.167*EXP((RMU(1,M)*SB(II)-RMU(1,M)*              *COR
     1SB(III))/1.9869)                                                                *COR
  603 CONTINUE                                                                        *COR
      GO TO 10                                                                        *COR
  334 IF(KR(9).EQ.3) GO TO 801                                                        *COR
      KR(9)=3                                                                         *COR
      DO 802 M=1,MT                                                                   *COR
  802 XX(M)=FKF(M)                                                                    *COR
  801 DO 800 M=1,MT                                                                   *COR
      IF(IUP(M).NE.1) GO TO 804                                                       *COR
      PPX(M)=P*PSI(1,M)                                                               *COR
      GO TO 800                                                                       *COR
  804 PPX(M)=0.0                                                                      *COR
      DO 805 J=2,4                                                                    *COR
      I=NPP(J,M)                                                                      *COR
      II=NPF(J,M)                                                                     *COR
  805 PPX(M)=PPX(M)+PSI(J,M)*VN(I) +FKK(J,M)*VN(II)                                   *COR
      II=NPF(1,M)                                                                     *COR
      I =NPF(1,M)                                                                     *COR
      PPX(M)=VN(I)+PPX(M)+FKK(1,M)*VN(I)                                              *COR
  800 FKF(M)=XX(M)*PPX(M)                                                             *COR
      IF(KR(9).NE.3) GO TO 10                                                         *COR
      DO 11 M=1,MT                                                                    *COR
   11 PPX(M)=-1.0                                                                     *COR
   10 RT = 1.9869 * T                                                    KINE0330  *COR
      DO 40 M=1,MT                                                       KINE0340  *COR
      SUMC = 0.                                                          KINE0350  *COR
      SUMK = 0.                                                          KINE0360  *COR
      SUMR = 0.                                                          KINE0370  *COR
      SUMP = 0.                                                          KINE0380  *COR
      DO 15 IZ=1,4                                                                    *COR
      IF(ABS(RMU(IZ,M)).LT.1.E-6) GO TO 17                                            *COR
      I=NMR(IZ,M)                                                                     *COR
      IF(IFC(I).EQ.-1.AND.I.EQ.JC) GO TO 14                                           *COR
      IF(IFC(I).EQ.0.OR.IFC(I).EQ.1) GO TO 14                                         *COR
   12 VK2=0.0                                                                         *COR
      VK1=0.0                                                                         *COR
      GO TO 35                                                                        *COR
   14 SUMR=SUMR+RMU(IZ,M)*Y(I)                                                        *COR
   16 VLNI =H(I)/RT+SB(I )/1.9869                                                     *COR
      SUMK=SUMK                        -RMU(IZ,M)*VLNI                            *COR
```

```
      SUMD=SUMD                  -PMU(IZ,M)*W(I)                                *COR
   17 IF(ABS(PMU(IZ,M)).LT.1.E-6) GO TO 15                                      *COR
      II=NMP(IZ,M)                                                              *COR
      IF(IFC(II).EQ.-1.AND.II.EQ.JC) GO TO 22                                   *COR
      IF(IFC(II).LT.0.02.IFC(II).GT.1) GO TO 12                                 *COR
   22 SUMP=SUMP+PMU(IZ,M)*Y(II)                                                 *COR
   21 VLNII=-H(II)/RT+SP(II)/1.9869                                             *COR
      SUMK=SUMK+PMU(IZ,M)*VLNII                                                 *COR
      SUMD=SUMD+PMU(IZ,M)*W(II)                                                 *COR
   15 CONTINUE                                                                  *COR
      DO 16 I=1,IS                                                              *COR
      PRMU(I,M)=0.0                                                             *COR
      DO 16 IZ=1,5                                                              *COR
      III=NMP(IZ,M)                                                             *COR
      VNMMR=VNU(III,I)                                                          *COR
      IF(NMP(IZ,M).GT.IS) GO TO 704                                             *COR
      VNUMR=0.0                                                                 *COR
      IF(NMR(IZ,M).EQ.I) VNUMR= 1.0                                             *COR
  704 II=NMP(IZ,M)                                                              *COR
      VNUMP=VNU(II,I)                                                           *COR
      IF(NMP(IZ,M).GT.IS) GO TO 16                                              *COR
      VNUMP=0.0                                                                 *COR
      IF(NMP(IZ,M).EQ.I) VNUMP= 1.0                                             *COR
   16 PRMU(I,M)=PRMU(I,M)+VNUMP*PMU(IZ,M)-VNUMR*PMU(IZ,M)                       *COR
C     EQUILIBRIUM CONSTANTS FOR KINETIC REACTIONS IN TERMS OF BASE SPECIKINE0450 *COR
C          LOG KP-S                                                  KINE0460   *COR
C     DERIVATIVES OF LOGS OF ABOVE KP-S WITH RESPECT TO LOG T        KINE0480   *COR
      DKPT(M) = SUMD / ST                                            KINE0490   *COR
C     RIGHT HAND SIDE (OR REVERSE PART) OF DRIVING POTENTIAL         KINE0500   *COR
      VKL=ALOG(AA*FKF(M))+EXK(M)*ALOG(T)-FAK(M)/RT                              *COR
      PKR(M)=EXP(AMIN1(SUMP-SUMK+VKL,80.))                                      *COR
C     LEFT HAND SIDE (OR FORWARD PART) OF DRIVING POTENTIAL          KINE0520   *COR
      PKR(M)=EXP(AMIN1(SUMK+VKL,80.))                                           *COR
      VK1 = PKR(M) - PKP(M)                                          KINE0540   *COR
      IF (VK1) 25,20,25                                              KINE0550   *COR
   20 VK1=1.E-9*SIGN(PKR(M),SUMK-SUMP+SUMX)                                     *COR
   25 CONTINUE                                                                  *COR
      VK2=AA*FKF(M)*T**EXK(M)*EXP(-FAK(M)/RT)                                   *COR
C     PM TIMES FORWARD RATE OF REACION I  (PM=AA)                    KINE0630   *COR
   35 PMR(M)=VK1                                                                *COR
      PKP(M)=AMAX1(PKP(M),1.E-25)                                               *COR
      PKK(M)=PKR(M)/PKP(M)                                                      *COR
      RAT(M)=AMAX1(PKP(M),PKR(M))                                               *COR
      IF(KR(7)-1) 40,40,36                                                      *COR
   36 IF(M-1) 37,37,39                                                          *COR
   37 WRITE(KOUT,38)                                                            *COR
   38 FORMAT(2X1HM7X3HLKP6X6HDLKP/DLT6X4HPMRR8X4HPMRP9X3HPMR9X3HRAT)            *COR
   39 WRITE(KOUT,41) M,SUMK,DKPT(M),PKR(M),PKP(M),PMR(M),RAT(M)                 *COR
   40 MA(M) = M                                                      KINE0680   *COR
   41 FORMAT(I3,2X,6E12.5)                                                      *COR
   45 FORMAT(1X2(HA(I,J),B(I),I=1,8,J=1,8 IN)                        KINE0690   *COR
   50 FORMAT(1X12L10.3)                                              KINE0700   *COR
   55 FORMAT(1X2(HA(I,J),B(I),I=1,8,J=1,8 OUT)                       KINE0710   *COR
      IF (KR(7) - 1) 80,80,65                                        KINE0730   *COR
   65 CONTINUE                                                                  *COR
      WRITE(KOUT,50) ((PRMU(II,JJ),JJ=1,MT),II=1,IS)                            *COR
      WRITE(KOUT,215)                                                KINE0820   *COR
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```
      WRITE(KOUT,50)(EB(I),I=1,IS)
   70 WRITE(KOUT,45)
      DO 75 I=1,ISP2
   75 WRITE(KOUT,50)(A(I,J),J=1,ISP2),R(I)
   80 CONTINUE
C*****ORDER REACTIONS
   85 IF (MT - 1) 105,105,90
   90 K = 0
      DO 100 M=2,MT
      IF (RAT(M) - RAT(M - 1)) 100,100,95
   95 K = MA(M)
      MA(M) = MA(M - 1)
      MA(M - 1) = K
      DUM1 = RAT(M)
      RAT(M) = RAT(M - 1)
      RAT(M - 1) = DUM1
  100 CONTINUE
      IF (K) 105,105,85
C*****START SECOND MAJOR LOOP ON REACTIONS
  105 DO 200 MM=1,MT
      M = MA(MM)
C*****IS IT A CONTROLLING REACTION
      LL(MM) = 0
      DO 125 L=1,IS
      IF(ABS(PRDU(L,M)).LT.1.E-6) GO TO 125
  110 DO 115 K=1,MM
      IF (L - LL(K)) 115,125,115
  115 CONTINUE
      IF (RAT(MM) - EE(L)) 125,125,120
C * * YES,IT IS FOR MASS BALANCE L
  120 LL(MM) = L
  125 CONTINUE
C * * NO, IT IS NOT, ADD INTO ALL MASS BALANCES
      I1 = 1
      I2 = IS
      GOTO 170
C*****REARRANGE ACCORDING TO CONTROLLING REACTION
  130 DUM1 = PRDU(L,M)
      PRDU(L,M) = 0.
      DO 165 I=1,IS
      IF (PRDU(I,M)) 135,165,135
  135 DUM2 = PRDU(I,M) / DUM1
      MP = MM + 1
      IF (MT - MP) 155,140,140
  140 DO 150 K=MP,MT
      MI = MA(K)
      PRDU(I,MI) = PRDU(I,MI) - DUM2 * PRDU(L,MI)
      IF (ABS(PRDU(I,MI)) - .001) 145,150,150
  145 PRDU(I,MI) = 0.
  150 CONTINUE
  155 DO 160 K=1,ISP2
  160 A(I + 2,K) = A(I + 2,K) - DUM2 * A(L + 2,K)
      R(I + 2) = R(I + 2) - DUM2 * E(L + 2)
      E(I)=E(I)-DUM2*E(L)
      DUM2 = ABS(DUM2)
      EE(I) = AMAX1(EE(I) ,DUM2 * EE(L))
  165 CONTINUE
```

```
KINE0830      *COR
KINE0840      *COR
KINE0850      *COR
KINE0860      *COR
KINE0870      *COR
KINE0880      *COR
KINE0890      *COR
KINE0900      *COR
KINE0910      *COR
KINE0920      *COR
KINE0930      *COR
KINE0940      *COR
KINE0950      *COR
KINE0960      *COR
KINE0970      *COR
KINE0980      *COR
KINE0990      *COR
KINE1000      *COR
KINE1010      *COR
              *COR
KINE1030      *COR
KINE1040      *COR
KINE1050      *COR
KINE1060      *COR
              *COR
KINE1080      *COR
KINE1090      *COR
KINE1100      *COR
KINE1110      *COR
KINE1120      *COR
KINE1130      *COR
KINE1150      *COR
KINE1160      *COR
KINE1170      *COR
KINE1180      *COR
KINE1190      *COR
KINE1200      *COR
KINE1210      *COR
KINE1220      *COR
KINE1230      *COR
KINE1240      *COR
KINE1250      *COR
KINE1260      *COR
KINE1270      *COR
KINE1280      *COR
KINE1290      *COR
KINE1300      *COR
KINE1310      *COR
KINE1320      *COR
KINE1330      *COR
KINE1340      *COR
KINE1350      *COR
KINE1360      *COR
              *COR
KINE1371      *COR
KINE1380      *COR
KINE1390      *COR
```

```
      PRMU(L,M) = DUM1                                                  KINE1400                *COR
C*****ADD CONTROLLING REACTION INTO ITS MASS BALANCE                    KINE1410                *COR
      I1 = 1                                                            KINE1420                *COR
      I2 = 1                                                            KINE1430                *COR
  170 DO 175 J=1,IS                                                     KINE1440                *COR
      SUMD=0.0                                                                                  *COR
      DO 500 JJ=1,M                                                                             *COR
      I=NPP(JJ,M)                                                                               *COR
      VNMPP=VNU(I,J)                                                                            *COR
      IF(NPP(JJ,M).GT.IS) GO TO 502                                                             *COR
      VNMPP=0.                                                                                  *COR
      IF(NPP(JJ,M).EQ.J) VNMPP= 1.0                                                             *COR
  502 II =NPP(JJ,M)                                                                             *COR
      VNMPP=VNU(II,J)                                                                           *COR
      IF(NPP(JJ,M).GT.IS) GO TO 503                                                             *COR
      VNMPP=0.                                                                                  *COR
      IF(NPP(JJ,M).EQ.J) VNMPP= 1.0                                                             *COR
  503 SUMD=SUMD-PPR(M)*VM(I         )*PSI(JJ,M)/EPX(M)*VNMPP-PPR(M)                           *COR
     1*VM(II       ) *EKK(JJ,M)/EKKS(M)*VNMPP                                                 *COR
  500 CONTINUE                                                                                  *COR
      DO 501 IZ=1,4                                                                             *COR
      III=NMR(IZ,M)                                                                             *COR
      VNMMP=VNU(III,J)                                                                          *COR
      IF(NMR(IZ,M).GT.IS) GO TO 504                                                             *COR
      VNMMP=0.0                                                                                 *COR
      IF(NMR(IZ,M).EQ.J) VNMMP= 1.0                                                             *COR
  504 II=NMR(IZ,M)                                                                              *COR
      VNMMP=VNU(II,J)                                                                           *COR
      IF(NMR(IZ,M).GT.IS) GO TO 505                                                             *COR
      VNMMP=0.0                                                                                 *COR
      IF(NMR(IZ,M).EQ.J) VNMMP= 1.0                                                             *COR
  505 SUMD=SUMD+RMU(IZ,M)*PKK(M)*VNMMP-PMU(IZ,M)*PKP(M)*VNMMP                                   *COR
  501 CONTINUE                                                                                  *COR
      DO 175 I=I1,I2                                                    KINE1460                *COR
  175 A(I + 2*J + 2) = A(I + 2*J + 2) - SUMF * PRMU(I,M)                KINE1470                *COR
      SUMF=0.0                                                                                  *COR
      SUMD=0.0                                                                                  *COR
      DO 506 JJ=1,M                                                                             *COR
      DPDP=0.0                                                                                  *COR
      III=NPP(JJ,M)                                                                             *COR
      IF(NPP(JJ,M).GT.IS)                                                                       *COR
     *DPDP= -PMR(M)*VM(III       )*PSI(JJ,M)/EPX(M)                                           *COR
      SUMD=SUMD-DPDP*TC(III)                                                                    *COR
      SUMF=SUMF-DPDP*F(III)                                                                     *COR
      DPDP=0.0                                                                                  *COR
      II=NPP(JJ,M)                                                                              *COR
      IF(NPP(JJ,M).GT.IS)                                                                       *COR
     *DPDP=-PPR(M)*VM(II        )*EKK(JJ,M)/EKKS(M)                                          *COR
      SUMD=SUMD-DPDP*TC(II)                                                                     *COR
  506 SUMF=SUMF-DPDP*F(II)                                                                      *COR
      DO 507 IZ=1,4                                                                             *COR
      DPDP=0.0                                                                                  *COR
      IF(NMR(IZ,M).GT.IS)                                                                       *COR
     *DPDP= RMU(IZ,M)*EKK(M)                                                                    *COR
      III=NMR(IZ,M)                                                                             *COR
      SUMD=SUMD-DPDP*TC(III)                                                                    *COR
      SUMF=SUMF-DPDP*F(III)                                                                     *COR
```

```
      DPRE=0.0                                                                  *COR
      IF(LMP(IZ,M).GT.IS)                                                       *COR
     *DPRE=-PMU(IZ,M)*PKP(M)                                                    *COR
      II=LMP(IZ,M)                                                              *COR
      SUME=SUMD-EREP*TC(II)                                                     *COR
  507 SUME=SUME-DUMP*E(II)                                                      *COR
      SUMD=-PKP(M)*EXPT(I)-(EXP(M)/EI+EXP(M))*PEP(M)-SUMD                       *COR
      DO 180 I=1,I2                                                 KINE1490    *COR
      DUM1 = PMU(I) * PREP(I,M)                                     KINE1500    *COR
      A(I+2,2)=A(I+2,2)-DUM1                                                    *COR
      A(I + 2,1) = A(I + 2,1) + SUMD * PMU(I,M)                     KINE1510    *COR
      E(I)=E(I)+DUM1                                                            *COR
      B(I+2)=B(I+2)+DUM1-SUME*EMU(I,M)                                          *COR
  180 EB(I) = AMAX1(EB(I) ,ABS(EMU(I,M) * PAT(KM)))                 KINE1530    *COR
      IF (KRIT) - 1) 200,200,185                                    KINE1540    *COR
  185 WRITE(KOUT,215)                                               KINE1550    *COR
      WRITE(KOUT,50)(EE(I),I=1,IS)                                  KINE1560    *COR
  190 WRITE(KOUT,55)                                                KINE1570    *COR
      DO 195 I=1,ISP2                                               KINE1580    *COR
      WRITE(KOUT,50)(A(I,J),J=1,ISP2),E(I)                          KINE1590    *COR
  195 CONTINUE                                                      KINE1600    *COR
      WRITE(KOUT,5)N,I1,I2,EL,LL,MM,MA                              KINE1610    *COR
      WRITE(KOUT,50) ((PPMU(II,JJ),JJ=1,NT),II=1,IS)                            *COR
  200 CONTINUE                                                      KINE1630    *COR
      DO 206 MM=1,NT                                                            *COR
      L=LL(MM)                                                                  *COR
      L=0                                                                       *COR
      IF(L) 201,206,201                                                         *COR
  201 M=MA(MM)                                                                  *COR
      AR=1.                                                                     *COR
      EXEL=(PKP(M)+1.E-36)/(PKP(M)+1.E-36)                                      *COR
      IF(ABS(EXEL-1.)-.1) 204,204,202                                           *COR
  202 ELK=ALOG(EXEL)                                                            *COR
      AR=EXEL/(EXEL-1.)-1./ELK                                                  *COR
  204 DO 205 J=1,IS                                                             *COR
  205 A(L+2,J+2)=A(L+2,J+2)+E(L)*(PMU(J,M)*(1.-AR)+AR*PMU(J,M))                 *COR
      A(L+2,1)=A(L+2,1)-E(L)*PKPT(M)*(1.-AR)                                    *COR
  206 CONTINUE                                                                  *COR
      ENL = 0.                                                      KINE1650    *COR
      DO 210 I=3,ISP2                                               KINE1660    *COR
      IF (EB(I-2) .NE. 0.0) ENL=AMAX1(ABS(E(I-2))/EB(I-2),ENL)                  *COR
  210 CONTINUE                                                                  *COR
  215 FORMAT(1X12HEB(N),N=1,NT)                                     KINE1680    *COR
      IF(ENL-1.E-5) 216,216,225                                                 *COR
  216 IF(EL-1.E-4) 220,225,225                                                  *COR
  220 IT=ITS                                                                    *COR
      ITS=-1                                                                    *COR
  225 RETURN                                                        KINE1710    *COR
      END                                                           KINE1720    *COR
                                                                                *COR
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      SUBROUTINE OUTPT                                                  OUTP0001
      DIMENSION IO(25)                                                  OUTP0002
      DIMENSION SPIE(10,10)                                                      *COR
C                                                                       OUTP0003
      REAL NFIA(1),NFIB(1),FFIN(1),TAU(10,10)                           OUTP0004
      EQUIVALENCE (NFIA(1),A(1)), (NFIB(1),A(51)), (FFIN(1),A(101)),    OUTP0005
     1(TAU(1),A(151))                                                   OUTP0006
      DIMENSION TF(180),CIJ(180,1)                                      OUTP0007
      DIMENSION X(1),VLAM(180,1)                                        OUTP0008
C                                                                       OUTP0009
      COMMON          FAMOA(180),FAMOB(180),RB(180,2),RC(180,2),        OUTP0010
     1                RD(180,2),RE(180,2),RF(180,2),TU(180,2),VN(180),  OUTP0011
     2                Y(180),WTN(180),VNU(180,10),FF(180),IFC(180),     OUTP0012
     3                IP(180),CP(180),H(180),SB(180),TC(180),VLNK(180), OUTP0013
     4                E(180),LAMI(180),GAMK(1,1)                        OUTP0014
C                                                                       OUTP0015
      COMMON /PARAM1/ KIN,KOUT,JAN,MOL,NAP,IDC,N,KKX(3),KR(10),TILE(3), OUTP0016
     1                TTMIN,TTMAX,VISC,PR(1)                            OUTP0017
C                                                                       OUTP0018
      COMMON /PARAM2/ WM,SCH,RHO,VEL,R1,MFF,FFA,IS,ISP,P,T,SIP,HIP,     OUTP0019
     1                EL,EML,FLIQ,NG,IFL,ISPO,KRALP,CPF,IRE,IFK,AA,ITS, OUTP0020
     2                IN,IL,IT,MODE,HMELT,SMELT,TMAX,TMIN,MELT,SUMN,    OUTP0021
     3                SUML,JC,HG,CPG,SVA,SVR,SVC,SVD,SUMC,NXC,SA1,      OUTP0022
     4                VMACH,KRZZ,SP1,GAM,THI,MX,DMCHT,HCH,NCV,THT,      OUTP0023
     5                IERZ,NOAT,SR1,IXG,SV1,KKJ,IXC,NXG,SH1,NOATO,      OUTP0024
     6                SA2,FEF,WS,RV,CMF,VA,HOS,DUM1,DUM2,FP,IFCJC,      OUTP0025
     7                ISP2,WTG,VMU2,WTL                                 OUTP0026
C                                                                       OUTP0027
      COMMON /ARRAYS/ A(16,16),B(16),W(3),XC(50),XG(50),ZKE(10),        OUTP0028
     1                TLO(10),DMCLO(10),WALJP(10),FB(10),ALP(10),       OUTP0029
     2                GAMH(10),GAME(10),TO(10,3),TK(10,3),WAT(10),      OUTP0030
     3                IR(10),IOAT(10),KAT(10),UR(10,10),FRL(10)         OUTP0031
      EQUIVALENCE (TU(181),TF(1)), (VNU(1),CIJ(1))                      OUTP0032
C                                                                       OUTP0033
      COMMON /KINETX/ MT,FKE(50),FAK(50),FXK(50),PMU(10,50),RMU(10,50), OUTP0034
     1       PRR(50),RKKK(50)                                                   *COR
C                                                                       OUTP0036  **-1
      EQUIVALENCE (B(1),Y(1)), (GAMK(1),VLAM(1))                        OUTP0037
C                                                                       OUTP0038
      COMMON/ACF1/GAMEX,REEN,PCH,ACHSQ,SGMAK,SXP                        OUTP0039
C                                                                       OUTP0040
      COMMON /DIFFER/ IR(11),FRU(10),PMUS(10),SLAM(10),PF(10),BY(10),   OUTP0041
     1                IRC(10),JJ(10),SLB(16),SLA(16,16)                 OUTP0042
C                                                                       OUTP0043
      COMMON/CARKIN/ KRK(10),RGUCM,NCC                                  OUTP0044
      DATA (SPIE(1,I),I=1,9)/4HLAYE,4HR-OR,4HIENT,4HED P,4HYROL,4HYTIC,         *COR
     *4H GRA,4HPHIT,4HE   /                                                     *COR
      DATA (SPIE(2,I),I=1,9)/4HEDGE,4H-OBT,4HENTE,4HD PY,4HROLY,4HTIC ,         *COR
     *4HGRAP,4HHITE,4H    /                                                     *COR
      DATA (SPIE(3,I),I=1,9)/4HBULK,4H GRA,4HPHIT,4HE   ,4H    ,4H    ,         *COR
     *4H    ,4H    ,4H    /                                                     *COR
      DATA (SPIE(4,I),I=1,9)/4HG-90,4H    ,4H    ,4H    ,4H    ,4H    ,         *COR
     *4H    ,4H    ,4H    /                                                     *COR
      DATA (SPIE(5,I),I=1,9)/4HATJ ,4HGRAP,4HHITE,4H    ,4H    ,4H    ,         *COR
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      *4H    ,4H    ,4H    /                                                    *COR
       DATA (SPIF(6,I),I=1,9)/4HCARB,4HITEX,4H 700,4H    ,4H    ,4H    ,       *COR
      *4H    ,4H    ,4H    /                                                    *COR
       DATA (SPIF(7,I),I=1,9)/4HFC 9,4H01  ,4H    ,4H    ,4H    ,4H    ,       *COR
      *4H    ,4H    ,4H    /                                                    *COR
       DATA (SPIF(8,I),I=1,9)/4HSTC/,4HPG  ,4H    ,4H    ,4H    ,4H    ,       *COR
      *4H    ,4H    ,4H    /                                                    *COR
       ASQRT(Q)=SIGN(SQRT(ABS(Q)),Q)                                  OUTP0045
       TAN(Q)=SIN(Q)/COS(Q)                                           OUTP0046
       HERS=0.01                                                      OUTP0047
C      FIND VKIN AS FIRST NONZERO FRF(M)                              OUTP0048
       VKIN=ROUGH                                                     OUTP0049
       XM=AA/P                                                        OUTP0050
       CALL ETIMER (TIME)                                             OUTP0051
       WRITE (KOUT,350)  IT,TIME                                      OUTP0052
       SHIP=HIP                                                       OUTP0053
       SSIP=SIP                                                       OUTP0054
       KRR=KR(8)                                                      OUTP0055
       IF (JC*(N+1-IRF)) 5,5,10                                       OUTP0056
 5     JC=N+1                                                         OUTP0057
       KRR=0                                                          OUTP0058
 10    HG=0.                                                          OUTP0059
       HL=0.                                                          OUTP0060
       SG=0.                                                          OUTP0061
       SL=0.                                                          OUTP0062
       SPL=0.                                                         OUTP0063
       HIP=0.                                                         OUTP0064
       WTLS=WTL                                                       OUTP0065
       SIP=0.                                                         OUTP0066
       PMU2=0.                                                        OUTP0067
       HTIL=0.                                                        OUTP0068
       RRRM=R(3)                                                      OUTP0069
       IT=I*1.0                                                       OUTP0070
       DO 25 J=1,6                                                    OUTP0071
       IF (FF(J) .EQ. 0.0) GO TO 11                                   *COR
       HTIL=HTIL+VN(J)/FF(J)*H(J)                                     OUTP0072
       PMU2=PMU2+VA(J)/FF(J)*WT*(J)                                   OUTP0073
    11 CONTINUE                                                       *COR
       VA=VN(J)*H(J)                                                  OUTP0074
       IF (IFC(J)) 20,15,20                                           OUTP0075
 15    HG=HG+VA                                                       OUTP0076
       SG=SG+VN(J)*(SP(J)-1.4869*Y(J))                                OUTP0077
       GO TO 25                                                       OUTP0078
 20    HL=HL+VA                                                       OUTP0079
       SL=SL+VN(J)*SH(J)                                              OUTP0080
       SPL=SPL+VA(J)                                                  OUTP0081
 25    CONTINUE                                                       OUTP0082
       RV=R(2)+W(3)-WTLS/WTG                                          OUTP0083
       IF (KR(8)) 35,35,30                                            OUTP0084
 30    WTLS=WTLS+VN(N+1)                                              OUTP0085
       RRRM=RRRM+VA(N+1)/WTG                                          OUTP0086
 35    HTIL=HTIL/PMU2                                                 OUTP0087
       IF (SPL) 45,40,45                                              OUTP0088
 40    WTLS=0.                                                        OUTP0089
       WTL=1.E-30                                                     OUTP0090
       SPL=1.0                                                        OUTP0091
 45    WTL=WTLS/WTG                                                   OUTP0092
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112.          HL=HL+VN(MFLT)*FLTG*HXFLT                                        OUTP0093
113.          SL=SL+VN(MFLT)*FLTG*SXFLT                                        OUTP0094
114.          HIP=(HL+HG)/AA                                                   OUTP0095
115.          SIP=(SL+SG)/AA                                                   OUTP0096
116.          KR1=KR(1)-IFIX(KR)*KRR                                           OUTP0097
117.          FAF=GAMEX                                                        OUTP0098
118.          IF (KR(4)) 60,50,55                                              OUTP0099
119.    50    HTTL=HG/AA                                                       OUTP0100
120.          FAF=0.                                                           OUTP0101
121.    55    WSD=AMAX1(WS-W(3)+RPRM,1.E-30)                                   OUTP0102
122.          HIP=(HG+(HL-WTR*HG)/WSD)/AA                                      OUTP0103
123.          SIP=0.                                                           OUTP0104
124.    60    RHO=P*WM/(T*1.3146)                                              OUTP0105
125.          RHOG=WTG/(T*1.3146)                                              OUTP0106
126.          HG=HG/WTG*1.8                                                    OUTP0107
127.          HL=HL/WTL*1.8                                                    OUTP0108
128.          SL=SL/WTL                                                        OUTP0109
129.          SG=SG/WTG                                                        OUTP0110
130.          HRP=HIP*1.8                                                      OUTP0111
131.          WRG=WTG/P                                                        OUTP0112
132.          WML=WTL/SPL                                                      OUTP0113
133.          IF (KR(6)) 65,70,70                                              OUTP0114
134.    65    WRITE (KOUT,355)  WTR                                            OUTP0115
135.          WRITE (KOUT,360)  TT,T,P                                         OUTP0116
136.          GO TO 100                                                        OUTP0117
137.    70    WRITE (KOUT,435)                                                 OUTP0118
138.       75 NSPIE = KRR(4)                                                                *COR
139.          WRITE (KOUT,415) (SPIE(NSPIE,I),I=1,9)                           *COR
140.    95    WRITE (KOUT,430)  ROUCM                                          OUTP0126    **-7
141.          WRITE (KOUT,410)  RV,RPRM                                        OUTP0127
142.          WRITE (KOUT,440)  TT,T,P                                         OUTP0128
143.   100    WRITE (KOUT,365)  HG,HL,HRP,SG,SL,SIP,RHOG,RHO,WRG,WML,WM        OUTP0129
144.          IF (KKJ) 105,110,110                                             OUTP0130
145.   105    VELSQ=( (SV1 * SIN(SA1)) * * 2. + ( (SR1 / RHO) * SV1 * COS(SA1)) OUTP0131
146.         1* * 2.)/46054.                                                   OUTP0132
147.          SA2=(ATAN(RHO / SR1 * TAN(SA1)))*57.29577                        OUTP0133
148.          SD1=SA1*57.29577                                                 OUTP0134
149.          SH1=SH1*1.8                                                      OUTP0135
150.          SQMAK=(VELSQ / GAM * WM / (1.9869 * T))                          OUTP0136
151.          VMACH=ASQRT(SQMAK)                                               OUTP0137
152.          VEL=ASQRT(VELSQ*46054.)                                          OUTP0138
153.          FLUX=VEL*EXP                                                     OUTP0139
154.          WRITE (KOUT,380)  VEL,VMACH,SA2                                  OUTP0140
155.          HRH=HCH*1.8                                                      OUTP0141
156.          WRITE (KOUT,385)  SV1,SH1,HRH,SP1,SR1,SD1                        OUTP0142
157.          SH1=SH1/1.8                                                      OUTP0143
158.          GO TO 140                                                        OUTP0144
159.   110    IF (KR(5)-1) 115,130,125                                         OUTP0145
160.   115    IF (KR(5)) 120,140,140                                           OUTP0146
161.   120    WRITE (KOUT,395)                                                 OUTP0147
162.          HRH=HCH*1.8                                                      OUTP0148
163.          SD1=SA1*57.29577                                                 OUTP0149
164.          SB1=SHI*1.8                                                      OUTP0150
165.          WRITE (KOUT,400)  SV1,SB1,HRH,SP1,SR1,SD1                        OUTP0151
166.          GO TO 140                                                        OUTP0152
167.   125    HCH=HIP                                                          OUTP0153
168.          SCH=SIP                                                          OUTP0154
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      PCH=P                                                                  OUTP0155
      GO TO 140                                                              OUTP0156
  130 VELSQ=(HCH - HIP)*2.                                                   OUTP0157
      SQMAK=VELSQ/GAM*WM/(1.9869*T)                                          OUTP0158
      VMACH=ASQRT(SQMAK)                                                     OUTP0159
      VEL=ASQRT(VELSQ*45054.)                                                OUTP0160
      FLUX=VEL*RHO                                                           OUTP0161
      HKIN=(HCH-HIP)*1.8                                                     OUTP0162
      WRITE (KOUT,375)  HKIN,VEL,FLUX,VMACH                                  OUTP0163
      IF (KKX(1)-5) 140,135,140                                              OUTP0164
  135 PUNCH 470,  VEL, P, HG , PR(1)                                         OUTP0165
  140 CONTINUE                                                               OUTP0166
      IF (KR(10)) 145,185,145                                                OUTP0167
  145 IF (NCV + ITS) 150,185,185                                             OUTP0168
  150 WRITE (KOUT,445)                                                       OUTP0169
      W(2)=ROUCM                                                             OUTP0170
      IF (KKX(1)-3) 170,155,185                                              OUTP0171
C      SCRIMP OUTPUT FORMATS                                                 OUTP0172
  155 KSC=0                                                                  OUTP0173
      IF (BPRM) 165,165,160                                                  OUTP0174
  160 KSC=KR1                                                                OUTP0175
  165 WRITE (KOUT,475)  TILE (2),W(2),BPRM,T,FAF,HTIL,HIP,KSC,FAMOA(JC),OUTP0176
     1 FAMOB(JC),P,TILE                                                      OUTP0177
      PUNCH 480,        TILE (2),W(2),BPRM,T,FAF,HTIL,HIP,KSC,FAMOA(JC),OUTP0178
     1 FAMOB(JC),P,TILE                                                      OUTP0179
      GO TO 185                                                              OUTP0180
  170 CONTINUE                                                               OUTP0181
      IF (KKX(1)) 180,180,175                                                OUTP0182
  175 CONTINUE                                                               OUTP0183
C     THE SQUEE CALLS AND FORMAT 167 YIELD A COMPRESSED OUTPUT TO BE         OUTP0184
C     READ AS (F6.4,E8.5,2E6.4,F4.2,F7.5,F6.4,2F8.5,.....)                  OUTP0185
      CALL SQUEE (P,IO(1),4)                                                 OUTP0186
      CALL SQUEE (W(2),IO(4),4)                                              OUTP0187
      CALL SQUEE (BPRM,IO(7),5)                                              OUTP0188
      CALL SQUEE (VKIN,IO(10),4)                                             OUTP0189
      IO(13)=FAF*100.                                                        OUTP0190
      CALL SQUEE (T,IO(14),5)                                                OUTP0191
      CALL SQUEE (ABS(WTR),IO(17),4)                                         OUTP0192
      CALL SQUEE (HTIL,IO(20),5)                                             OUTP0193
      HIPP=HG/1.8                                                            OUTP0194
      CALL SQUEE (HIPP,IO(23),5)                                             OUTP0195
      KR1=KR1+1                                                              OUTP0196
      WRITE (KOUT,490)  IO,FAMOA(JC),FAMOB(JC),KR1,TILE                      OUTP0197
      PUNCH 485,   IO,FAMOA(JC), FAMOB(JC), KR1,TILE                         OUTP0198
      KR1=KR1-1                                                              OUTP0199
      W(2)=0.                                                                OUTP0200
      IF (KKX(1) - 1) 180,185,180                                            OUTP0201
  180 HIPP=HG/1.8                                                            OUTP0202
      WRITE (KOUT,495) P,W(2),BPRM,T,FAF,HTIL,HIPP,KR1,FAMOA(JC),FAMOB(JCOUTP0203
     1C)    ,WTR                                                            OUTP0204
      PUNCH 500,      P,W(2),BPRM,T,FAF,HTIL,HIPP,KR1,FAMOA(JC),FAMOB(JCOUTP0205
     1)    ,WTR                                                            OUTP0206
      W(2)=0.                                                                OUTP0207
  185 IF (ITS) 190,305,305                                                   OUTP0208
  190 IF (MT*KR(9)) 205,205,195                                              OUTP0209
  195 DO 200 L=1,MT                                                          OUTP0210
  200 PMR(L)=PMR(L)/AA                                                       OUTP0211
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      WRITE (KOUT,460) (I,PKR(L),L=1,MT)                                OUTP0212
      WRITE (KOUT,462) (I,PKRK(L),L=1,MT)                               *COR
  462 FORMAT(/6HR RATIO OF FORWARD TO REVERSE KINETICALLY CONTROLLED R2G *COR
     *DUCTION RATES   /5(I3,1H=F12.5))                                  *COR
  205 IF (KR(6)) 215,210,210                                            OUTP0213
  210 WRITE (KOUT,450)                                                  OUTP0214
      GO TO 240                                                         OUTP0215
  215 IF (KR(5)) 230,220,220                                            OUTP0216
  220 IF (KKJ) 235,225,235                                              OUTP0217
  225 WRITE (KOUT,370)                                                  OUTP0218
      GO TO 240                                                         OUTP0219
  230 WRITE (KOUT,405)                                                  OUTP0220
      GO TO 240                                                         OUTP0221
  235 WRITE (KOUT,390)                                                  OUTP0222
  240 DO 255 I=1,N                                                      OUTP0223
      IF (IFC(I)-1) 255,245,255                                         OUTP0224
  245 IF (KR(6)) 255,250,250                                            OUTP0225
  250 VN(I)=VN(I)/WM*FLN(I)                                             OUTP0226
  255 VR(I)=VN(I)/P                                                     OUTP0227
      IF (NCV) 260,260,280                                              OUTP0228
  260 IF (KR(7)-1) 265,265,280                                          OUTP0229
  265 IF (L-60) 270,270,275                                             OUTP0230
  270 WRITE (KOUT,505) (FAMOA(I),FAMOB(I),VN(I),I=1,N)                  OUTP0231
      GO TO 285                                                         OUTP0232
  275 WRITE (KOUT,510) (FAMOA(I),FAMOB(I),VR(I),I=1,N)                  OUTP0233
      GO TO 285                                                         OUTP0234
  280 WRITE (KOUT,465) (FAMOA(I),FAMOB(I),VN(I),FC(I),Y(I),VLMK(I),IFC(IOUTP0235
     1),F(I),CR(I),I=1,N)                                               OUTP0236
  285 DO 300 I=1,N                                                      OUTP0237
      IF (IFC(I)-1) 300,290,300                                         OUTP0238
  290 IF (KR(6)) 300,295,295                                            OUTP0239
  295 VN(I)=VN(I)/WTM(I)*WM                                             OUTP0240
  300 VR(I)=VR(I)*P                                                     OUTP0241
  305 IF (FLTG) 315,315,310                                             OUTP0242
  310 FSOL=1.-FLTG                                                      OUTP0243
      WRITE (KOUT,455)  FAMOA(MFLT),FAMOB(MFLT),FLTG,FSOL               OUTP0244
  315 IF (ITS) 320,345,345                                              OUTP0245
  320 IF (KR(5)) 325,340,325                                            OUTP0246
  325 IF (KKJ+KR(5)) 335,330,335                                        OUTP0247
  330 KKJ=1                                                             OUTP0248
      KR(1)=3                                                           OUTP0249
      NCHE=3                                                            OUTP0250
      KR(2)=1                                                           OUTP0251
      KR(5)=-3                                                          OUTP0252
      ACHSQ=0.                                                          OUTP0253
      ITS=0                                                             OUTP0254
      GAME=GAM/(GAM - 1.)                                               OUTP0255
C     FIRST GUESS OF STAGNATION PRESSURE BEHIND SHOCK                   OUTP0256
      P=( 1. + ( (GAM - 1.) / 2.) * (SQMAK)) * * GAME)*P                OUTP0257
      CALL  ETIME                                                       OUTP0258
  335 SXP=SIP                                                           OUTP0259
  340 RETURN                                                            OUTP0260
  345 HFE=SHIP                                                          OUTP0261
      STE=SSTP                                                          OUTP0262
      RETURN                                                            OUTP0263
C                                                                       OUTP0264
  350 FORMAT (/15H SOLUTION TIMES,/10X,13HITERATIONS = ,I4,23X,7HTIME = OUTP0265
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283.          1,E8.3,1X,4HSEC.)                                                  OUTP0266
284.      355  FORMAT (/42H CLOSED SYSTEM EQUILIBRIUM SOLUTION OUTPUT.//29H   MASOUTP0267
285.          1S CONDENSED/MASS GAS = ,F12.5)                                    OUTP0268
286.      360  FORMAT (3X,7HTEMP = ,F10.4,1X,6HDEG R,,2X,1H=,1X,F10.4,1X,6HDEG K,OUTP0269
287.          1,5X7HPRESS = F13.5,4H ATM)                                        OUTP0270
288.      365  FORMAT (/34X40HGAS              CONDENSED       COMPOSITE/3X,18HENTHOUTP0271
289.          1ALPY - BTU/LBM,5X,3(5X,F12.5)/3X,23HENTROPY - BTU/LBM DEG R,3(5X,FOUTP0272
290.          212.5)/3X,17HDENSITY - LBM/FT3,2(11XE12.5,11X)/3X16HMOLECULAR WEIGHOUTP0273
291.          3(5X,3(5X,F12.4)/)                                                 OUTP0274
292.      370  FORMAT (/2X71HCHEMICAL STATE  (MOLE FR. = MOLECULES / TOTAL GAS PHOUTP0275
293.          1ASE MOLECULES).....)                                              OUTP0276
294.      375  FORMAT (2X27HABOVE ARE STATIC PROPERTIES,15X,12HH-KINETIC = ,E12.5OUTP0277
295.          1,1X,7HBTU/LBM/3X,7HVEL. = ,F12.4,1X,6HFT/SEC,3X,7HFLUX = ,E12.5,1XOUTP0278
296.          2,10HLBM/FT2SEC,3X,7HMACH = ,F9.5)                                 OUTP0279
297.      380  FORMAT (3X,7HVEL2 = ,E12.4,1X,6HFT/SEC,5X,8HMACH2 = ,F9.5,3X,9HTHEOUTP0280
298.          1TA 2 =,F10.6,1X,3HDEG)                                            OUTP0281
299.      385  FORMAT (2X,60HABOVE ARE STATIC CONDITIONS DOWNSTREAM OF THE SHOCK OUTP0282
300.          1FOR ....,/3X,6HVEL1 =,E9.3,1X,6HFT/SEC,2X,11HH1-STATIC =,E9.3,1X,16OUTP0283
301.          2HBTU/LBM  H-TOT =,E9.3,1X, 7HBTU/LBM/3X,5HP1 = ,F12.5,1X,13HATM   OUTP0284
302.          3RHO1 = ,F12.5,1X,17HLBM/FT3 THETA 1 =,F10.6,1X,3HDEG)             OUTP0285
303.      390  FORMAT (/2X71HSTATIC CHEMICAL STATE (MOLE FR.=MOLECULES/TOTAL GAS OUTP0286
304.          1PHASE MOLECULES)...)                                              OUTP0287
305.      395  FORMAT (2X,76HABOVE ARE ISENTROPIC STAGNATION CONDITIONS DOWNSTREAOUTP0288
306.          1M OF THE SHOCK FOR . . .)                                         OUTP0289
307.      400  FORMAT (3X,6HVEL1 =,E9.3,1X,1PHFT/SEC  H1-STATIC =,E9.3,1X,16HBTU/OUTP0290
308.          1LBM  H-TOT =,E9.3,1X,7HBTU/LBM/3X,5HP1 = ,F12.5,1X,3HATM,3X,7HRHO1OUTP0291
309.          2 = ,E12.5,1X,20HLBM/FT3   THETA 1 = ,F10.6,1X,3HDEG)              OUTP0292
310.      405  FORMAT (/2X77HISEN. STAG. CHEMICAL STATE (MOLE FR.=MOLECULES / TOTOUTP0293
311.          1AL GAS PHASE MOLECULES)..)                                        OUTP0294
312.      410  FORMAT (26H  RHO V WALL/RHOE UE CM = ,E12.5,3X,9HBPRIME = ,E12.5) OUTP0295
313.        4) FORMAT (/, 13H  SURFACE IS , 10A4)                                          *COR
314.      430  FORMAT (36H  MASS TRANSFER COEFFICIENT ROUCM = ,E12.5)             OUTP0299  **-3
315.      435  FORMAT (/46H OPEN SYSTEM CHEMICAL KINETICS SOLUTION OUTPUT)        OUTP0300
316.      440  FORMAT (/39H  STATE ADJACENT TO THE SURFACE . . . ./3X,7HTEMP = , OUTP0301
317.          1 F10.4,1X,7HDEG R = ,F11.4,1X17HDEG K      PRESS = ,F13.5,1X3HATM) OUTP0302
318.      445  FORMAT (/2X,40HPUNCHED CARD OUTPUT (80 COLUMNS) . . . .)           OUTP0303
319.      450  FORMAT (/2X,38HCHEMICAL STATE ADJACENT TO THE SURFACE/3X,54H(MOLE OUTP0304
320.          1FR FOR GASES = MOLECULES / TOTAL GAS MOLECULES )/3X,50H(MOLE FR FOOUTP0305
321.          2R CONDENSED = BPRIME CONDENSED ). . . .)                          OUTP0306
322.      455  FORMAT (8X2A4,2HISE8.5,11H LIQUID AND E8.5,6H SOLID)              OUTP0307
323.      460  FORMAT (/54H  NET FORWARD RATE OF KINETICALLY CONTROLLED REACTIONSOUTP0308
324.          1/ 70H   (MOLES OF REACTION / UNIT SURFACE AREA / TIME / RHOE UE CMOUTP0309
325.          2). . . . /(I4,1H=E12.5,I3,1H=E12.5,I3,1H=E12.5,I3,1H=E12.5,I3,1H=EOUTP0310
326.          312.5))                                                            OUTP0311
327.      465  FORMAT ( /87H  SPECIES  MOL.FRAC.   O-LN-KP/O-LN-T  LOG-PP       LOUTP0312
328.          1OG-KP     FLAG   ERROR          CP  /(1X2A4,4E13.5,I5,2E13.5))    OUTP0313
329.      470  FORMAT (13X,3E11.5,22X,E11.2)                                      OUTP0314
330.      475  FORMAT (2X1H(4XA4,2F8.5,F9.4,F5.3,2F9.3,I2,2XA4,A2,F4.2,2A4,A2,1H)OUTP0315
331.          1)                                                                 OUTP0316
332.      480  FORMAT (     4XA4,2F8.5,F9.4,F5.3,2F9.3,I2,2XA4,A2,F4.2,2A4,A2,1H)OUTP0317
333.          1)                                                                 OUTP0318
334.      485  FORMAT  (I4,A1,I1,I4,A1,I1,I6,A1,I1,I4,A1,I1,                     OUTP0319
335.          1        I4,I5,A1,I1,I4,A1,I1,I6,A1,I1,I6,A1,I1,A4,A2,I1,4X,2A4,A2)OUTP0320
336.      490  FORMAT (3H  (I4,A1,I1,I4,A1,I1,I6,A1,I1,I4,A1,I1,I4,I5,A1,I1,     OUTP0321
337.          1    I4,A1,I1,I6,A1,I1,I6,A1,I1,A4,A2,I1,4X,2A4,A2,1H))            OUTP0322
338.      495  FORMAT (3H  (F8.4,2F8.5,F9.4,F5.3,2F9.3,I2,2X,2A4,E10.3,3H  ))    OUTP0323
339.      500  FORMAT  (   F8.4,2F8.5,F9.4,F5.3,2F9.3,I2,2X,2A4,E10.3)           OUTP0324
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      505   FORMAT (/3(5X7HSPECIES3X8HMOLE FR.2X)/(5X2A4,F12.5,5X2A4,F12.5,5X2OUTP0325
     1A4,E12.5))                                                              OUTP0326
      510   FORMAT (/5(5X7HSPECIES3X8HMOLE FR.2X)/(5X2A4,E12.5,5X2A4,E12.5,5X2OUTP0327
     1A4,E12.5,5X2A4,E12.5,5X2A4,F12.5))                                      OUTP0328
            END                                                               OUTP0329
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      SUBROUTINE THERM                                                  THER0001
      DIMENSION BLNK(30), BC(30)                                                *COR
C                                                                       THER0004    **-2
      REAL NFIA(1),NFIB(1),FFIN(1),TAU(10,10)                           THER0005
      EQUIVALENCE (NFIA(1),A(1)), (NFIB(1),A(51)), (FFIN(1),A(101)),    THER0006
     1(TAU(1),A(151))                                                   THER0007
      DIMENSION TF(180),CIJ(180,1)                                      THER0008
      DIMENSION X(1),VLAM(180,1)                                        THER0009
      DIMENSION FKAM(10,50)                                                     *COR
C                                                                       THER0010
      COMMON          FAMOA(180),FAMOR(180),R3(180,2),RC(180,2),        THER0011
     1                RD(180,2),RE(180,2),RF(180,2),TU(180,2),VP(180),  THER0012
     2                Y(180),WTM(180),VMU(180,10),FF(150),IFC(180),     THER0013
     3                IP(180),CP(180),H(180),SR(180),TC(180),VLAK(180), THER0014
     4                E(180),LAMI(180),GAMK(1,1)                        THER0015
C                                                                       THER0016
      COMMON /PARAM1/ KTB,KOUT,JAN,MUL,NAB,IDC,M,KFX(3),KR(10),TILE(3), THER0017
     1                TTMIN,TTMAX,VISC,PR(1)                            THER0018
C                                                                       THER0019
      COMMON /PARAM2/ WR,SCP,RHO,VEL,R1,NEE,EEA,TS,ISP,P,T,SIE,HIP,     THER0020
     1                EL,ENL,ELIO,NO,IFL,ISPO,KRALP,CPE,TRE,IER,AA,TTS, THER0021
     2                IN,IL,IT,MODE,HMELT,SMELT,TMAX,TMIN,MELT,SUMN,    THER0022
     3                SUML,JC,HG,CPG,SVA,SVB,SVC,SVD,SUMC,NXC,SA1,      THER0023
     4                VMACH,KRZZ,SP1,GAM,THI,MX,DMCHI,HCH,NCV,TPT,      THER0024
     5                IERZ,NOAT,SK1,IX6,SV1,KKJ,IXC,UX6,SH1,NOATO,      THER0025
     6                SA2,EEE,WS,RV,CME,VA,HOS,DUM1,DUM2,EP,IECJC,      THER0026
     7                ISP2,WTG,VMU2,WTL                                 THER0027
C                                                                       THER0028
      COMMON /ARRAYS/ A(16,16),B(16),W(3),XC(50),XG(50),ZKE(10),        THER0029
     1                TLO(10),DMCLO(10),VALJP(10),FB(10),ALP(10),       THER0030
     2                GAMH(10),GAME(10),TO(10,3),TK(10,3),WAT(10),      THER0031
     3                IR(10),IOAT(10),KAT(10),UG(10,10),FBL(10)         THER0032
      EQUIVALENCE (TU(181),TF(1)), (VMU(1),CIJ(1))                      THER0033
C                                                                       THER0034
      COMMON /KINETX/ MT,FKF(50),FAK(50),FXK(50),PMU(10,50),RMU(10,50), THER0035
     1                PMP(50),PKKK(50)                                          *COR
C                                                                       THER0037    **-1
      EQUIVALENCE (B(1),X(1)), (GAMK(1),VLAM(1))                        THER0038
C                                                                       THER0039
      COMMON /DIFFER/ IP(11),ENU(10),PNUS(10),SLAM(10),BE(10),BY(10),   THER0040
     1                IRC(10),JJ(10),SL5(16),SLA(16,16)                 THER0041
C                                                                       THER0042
      COMMON/ZKIN/ MGR(10,50),NMP(10,50),NPC(10,50),NPE(10,50),FKKS(50),        *COR
     *PPX(50),PSI(10,50),FKK(10,50),INP(50)                                     *COR
      COMMON/CAPKIN/ FRK(10),RGUCM,NCC                                  THER0043
                                                                                *COR
      REAL INHB                                                                 *COR
      DIMENSION FKFD(3,10),FAKD(3,10),FXKD(3,10),PSID(8,3,10),FKKD(8,3,1        *COR
     *0),RXSP(8,4),PRSP(8,4),INHB(8),POIS(8),ESS(5)                             *COR
      DATA (RXSP(1,I),I=1,4)/4HH2O ,4HC*  ,4H    ,4H    /,(RXSP(2,I),I=1        *COR
     *,4)/4HCO2 ,4HC*  ,4H    ,4H    /,(RXSP(3,I),I=1,4)/4HH2  ,4HC*  ,4        *COR
     *H    ,4H    /,(RXSP(4,I),I=1,4)/4HC*  ,4H    ,4H    ,4H    /,(RXSP      *COR
     *(5,I),I=1,4)/4HC*  ,4H    ,4H    ,4H    /,(RXSP(6,I),I=1,4)/4HC*         *COR
     *,4H    ,4H    ,4H    /,(RXSP(7,I),I=1,4)/4HC*  ,4H    ,4H    ,4H        *COR
     *  /,(RXSP(8,I),I=1,4)/4HC*  ,4H    ,4H    ,4H    /                      *COR
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      DATA (PRSP(1,I),I=1,4)/4HC0  ,4HH2  ,4H    ,4H    /,(PRSP(2,I),I=1
*,4)/4HC0  ,4H    ,4H    ,4H    /,(PRSP(3,I),I=1,4)/4HC2H2,4H    ,4
*H    ,4H    /,(PRSP(4,I),I=1,4)/4HC   ,4H    ,4H    ,4H    /,(PRSP
*(5,I),I=1,4)/4HC2  ,4H    ,4H    ,4H    /,(PRSP(6,I),I=1,4)/4HC3
*,4H    ,4H    ,4H    /,(PRSP(7,I),I=1,4)/4HC4  ,4H    ,4H    ,4H
*  /,(PRSP(8,I),I=1,4)/4HC5  ,4H    ,4H    ,4H    /
      DATA (INHR(I),I=1,8)/4HH20 ,4HC02 ,4HC0  ,4HH2  ,4HCLH ,4HFH  ,4H
*   ,4H    /
      DATA (POIS(I),I=1,8)/4HCLH ,4HFH  ,4H    ,4H    ,4H    ,4H    ,4H
*   ,4H    /
      DATA (ESS(I),I=1,5)/.125,.261,.012,.130,.000567
      DATA (EKED(I,1),I=1,3)/12.5,12.5,0.771/,(EAKD(I,1),I=1,3)/4.6E+4,
*4.6E+4,5.55E+4/,(EXKD(I,1),I=1,3)/0.0,0.0,0.0/,(EKED(I,2),I=1,3)/
*2.63724E+3,3.434485E+6,5.136124E+5/,(EAKD(I,2),I=1,3)/61910.5,
*69431.3,124460./,(EXKD(I,2),I=1,3)/0.0,0.0,0.0/,(EKED(I,3),I
*=1,3)/1.98E+5,1.98E+5,4.94E+7/,(EAKD(I,3),I=1,3)/6.55E+4,6.55E+4,
*1.295E+5/,(EXKD(I,3),I=1,3)/0.0,0.0,0.0/,(EKED(I,4),I=1,3)/.03868,
*.0015,1.9133/,(EAKD(I,4),I=1,3)/4175.34,4175.34,57175.34/,(EXKD(I,
*4),I=1,3)/-.29,-.29,0.0/,(EKED(I,5),I=1,3)/.74,3.493,19610.44/,(EA
*KD(I,5),I=1,3)/4551.4,4551.4,110500.0/,(EXKD(I,5),I=1,3)/0.0,0.0,0
*.0/,(EKED(I,6),I=1,3)/.478,14.4776,.017/,(EAKD(I,6),I=1,3)/34308.2
*,34308.2,34883.6/,(EXKD(I,6),I=1,3)/.617,.617,0.0/,(EKED(I,7),I=1,
*3)/6.8906E+5,1.31779E+7,4.41603E+4/,(EAKD(I,7),I=1,3)/101676.95,1
*01676.95,117282.75/,(EXKD(I,7),I=1,3)/.433,.433,0.0/
      DATA (EKED(I,8),I=1,3)/11.0901,208.87,0.700445/,(EAKD(I,8),I=1,3)/
*29386.7,29386.7,50640.4/,(EXKD(I,8),I=1,3)/0.0,0.0,0.0/
      DATA (PSID(I,1,1),I=1,8)/1.0,1.0,1.0,1.0,1.0,0.0,0.0,0.0,0.0,0.0/,(PSID(I,
*2,1),I=1,8)/1.0,1.0,1.0,1.0,1.0,0.0,0.0,0.0,0.0,0.0/,(PSID(I,3,1),I=1,8)/
*1.0,1.0,1.0,1.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0/,(PSID(I,1,2),I=1,8)/151.32,26.05,
*2.16,0.0,0.0,93.1145,0.0,0.0,0.0,0.0/,(PSID(I,2,2),I=1,8)/46.75,166.49,
*29.87,0.0,1325.44,0.0,0.0,0.0,0.0/,(PSID(I,3,2),I=1,8)/0.0,0.0,0.0,558,
*0.0,0.0,0.53,355,0.0,0.0,0.0/,(PSID(I,1,3),I=1,8)/1.0,1.0,1.0,1.0,1.0,0.0,0.0,
*0.0,0.0,0.0/,(PSID(I,2,3),I=1,8)/1.0,1.0,1.0,1.0,1.0,0.0,0.0,0.0,0.0,0.0/,
*(PSID(I,3,3),I=1,8)/1.0,1.0,1.0,1.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0/
      DATA (PSID(I,1,4),I=1,8)/.0331,.064,.021,.0058,1.0,0.0,0.0,0.0,0.0,0.0/,(P
*SID(I,2,4),I=1,8)/.0331,.064,.021,.0058,1.0,0.0,0.0,0.0,0.0,0.0/,(PSID(I,3
*,4),I=1,8)/.0058,.0058,.0058,0.0,0.0,0.0,0.0,0.0,0.0,0.0/,(PSID(I,1,5),I=1
*,8)/163.87,399.3,166.5,13.12,100.,0.0,0.0,0.0,0.0,0.0/,(PSID(I,2,5),I=1,8)
*/163.87,399.3,166.5,13.12,100.,0.0,0.0,0.0,0.0,0.0/,(PSID(I,3,5),I=1,8)/0.
*0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0/,(PSID(I,1,6),I=1,8)/16.61,142.25,75
*,69,21.8,.1,0.0,0.0,0.0,0.0,0.0/,(PSID(I,2,6),I=1,8)/16.61,142.25,75,69,21
*.8,.1,0.0,0.0,0.0,0.0,0.0/,(PSID(I,3,6),I=1,8)/0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0
*,0.0/,(PSID(I,1,7),I=1,8)/252.67,5418.31,.054,.0001,0.0,0.0,0.0,0.0,0.0,
*0/,(PSID(I,2,7),I=1,8)/252.67,5418.31,.054,.0001,0.0,0.0,0.0,0.0,0.0,0/,
*(PSID(I,3,7),I=1,8)/53.681,18.786,.059,0.0,0.0,0.0,0.0,0.0,0.0,0.0/
      DATA (PSID(I,1,8),I=1,8)/29.41,373.68,0.0,1.72,.01,2500.,0.0,0.0,0.0/,
*(PSID(I,2,8),I=1,8)/29.41,373.68,0.0,1.72,.01,2500.,0.0,0.0,0.0/,
*(PSID(I,3,8),I=1,8)/88.38,20.19,13.69,0.0,0.0,0.0,0.0,0.0,0.0,0.0/
      DATA (FKKD(I,1,1),I=1,8)/3.0,3.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0/,(FKKD(I,
*2,1),I=1,8)/3.0,3.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0/,(FKKD(I,3,1),I=1,8)/
*0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0/,(FKKD(I,1,2),I=1,8)/0.0,0.0,0.0,0.0,
*0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0/,(FKKD(I,2,2),I=1,8)/0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,
*0.0,0.0,0.0,0.0/,(FKKD(I,3,2),I=1,8)/0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0/,
*(FKKD(I,1,3),I=1,8)/3.0,3.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0/,(FKKD(I,2,3),
*I=1,8)/3.0,3.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0/,(FKKD(I,3,3),I=1,8)/0.0,
*0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0/
      DATA BLLK/4H    /
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      5     MODE=KR(1)                                                  THER0053
            IF (ITS) 50,10,50                                           THER0054
     10     WTG=0.                                                      THER0055
            WTL=0.                                                      THER0056
            IF (KR(8)) 40,40,15                                         THER0057
     15     IF (IFC(N+1)-1) 25,20,25                                    THER0058
     20     IF (T+.001-TF(N+1)) 25,25,30                                THER0059
     25     IFC(N+1)=-1                                                 THER0060
            VN(N+1)=0.                                                  THER0061
     30     DO 35 K=1,IS                                                THER0062
     35     VNU(N+1,K)=-TR(K,3)                                         THER0063
            WTL=-VN(N+1)                                                THER0064
     40     DUM2=0.                                                     THER0065
            SUMN=0.                                                     THER0066
            DO 45 I=1,IS                                                THER0067
            PMIS(I)=0.                                                  THER0068
     45     SLAK(I)=0.                                                  THER0069
     50     HMELT=0.                                                    THER0070
            FLTR=0.                                                     THER0071
            SMELT=0.                                                    THER0072
            MELT=1                                                      THER0073
            TMIN=TTMIN                                                  THER0074
            TMAX=TTMAX                                                  THER0075
            TEMAX=500.                                                  THER0076
            VA=ALOG(T / 3000.)                                          THER0077
            VB=T-3000.                                                  THER0078
            VC=(T + 3000.)/2.                                           THER0079
            VD=T*3000.                                                  THER0080
            VE=VC/(VD * VD)                                             THER0081
            RT=1.9869*T                                                 THER0082
            IF (NCV) 65,65,55                                           THER0083
     55     PIN=P*10.E-3                                                THER0084
            WM=20.                                                      THER0085
            AA=P*WM                                                     THER0086
            IF (MODE) 65,65,60                                          THER0087
     60     T=3000.                                                     THER0088
     65     CONTINUE                                                    THER0089
            I=1                                                         THER0090
            DO 255 IK=1,N                                               THER0091
            J=2                                                         THER0092
            IF (NCV) 80,80,70                                           THER0093
     70     IF (IFC(I)) 80,75,80                                        THER0094
     75     VN(I)=VN(I)+PIN                                             THER0095
            Y(I)=ALOG(VN(I))                                            THER0096
     80     CONTINUE                                                    THER0097
            IF (IFC(I) + 1) 185,85,85                                   THER0098
     85     IF (IFC(I)) 90,95,140                                       THER0099
     90     IF (MODE - 1) 185,180,165                                   THER0100
     95     IF (ITS) 185,100,185                                        THER0101
    100     SUMN=SUMN+VN(I)                                             THER0102
            DUM1=WTR(I)*VN(I)                                           THER0103
            WTG=WTG+DUM1                                                THER0104
            DUM2=DUM2+DUM1/FF(I)                                        THER0105
            IF (IK - IS) 105,105,115                                    THER0106
    105     PMIS(I)=VN(I)                                               THER0107
            IF (KR(6)) 185,110,130                                      THER0108
    110     SLAK(I)=VN(I)/FF(I)                                         THER0109
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**-9

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      GO TO 185                                                          THERA110
115   DO 125 K=1,IS                                                      THERA111
      DUM1=VAU(I,K)*VM(I)                                                THERA112
      IF (KR(6)) 125,120,125                                             THERA113
120   SLAB(K)=SLAB(K)+DUM1/FF(I)                                         THERA114
125   PHIS(K)=PHIS(K)+DUM1                                               THERA115
      IF (KR(6)) 165,185,130                                             THERA116
130   DO 135 K=1,IS                                                      THERA117
135   SLAM(K)=SLAM(K)+VLAM(I,K)*VM(I)                                    THERA118
140   IF (IFC(I) - 1) 145,145,185                                        THERA119
145   IF (ITS) 170,150,170                                               THERA120
150   IF (KR(6)) 165,155,155                                             THERA121
155   IF (T - TK(I) + .001) 160,160,165                                  THERA122
160   IFC(I)=-1                                                          THERA123
      VM(I)=0.                                                           THERA124
      GO TO 98                                                           THERA125
165   WTL=WTL+VM(I)*FM(I)                                                THERA126
170   IF (MODE - 1) 185,175,185                                          THERA127
175   TMIN=AMAX1(TMIN,TF(I))                                             THERA128
180   TFMAX=AMAX1(TF(I) ,TFMAX)                                          THERA129
185   IF (T - ABS(TU(I,1))) 190,195,195                                  THERA130
190   J=1                                                                THERA131
195   CP(I)=PC(I,J)+T*RO(I,J)+PF(I,J)/(T * T)                            THERA132
      R(I)=RR(I,J)+VM*(PC(I,J) + RO(I,J) * VC + PF(I,J) / V))            THERA133
      SR(I)=RF(I,J)+PC(I,J)*VA+VM*(RO(I,J) + RF(I,J) * VF)               THERA134
      IF (MODE - 2) 230,200,200                                          THERA135
200   IF (IFC(I) - 1) 230,205,230                                        THERA136
205   IF (TU(I,1)) 210,230,230                                           THERA137
210   IF (T + TU(I,1)) 220,215,225                                       THERA138
215   DMFLT=-U(I)-UMFLT                                                  THERA139
      SMFLT=-SR(I)-SMFLT                                                 THERA140
      MFLT=I                                                             THERA141
      IF (J - 2) 230,190,230                                             THERA142
220   TMAX=AMIN1(TMAX, - TU(I,1))                                        THERA143
      GO TO 230                                                          THERA144
225   TMIN=AMAX1(TMIN, - TU(I,1))                                        THERA145
230   TC(I)=-R(I)/RT                                                     THERA146
      VLAK(I)=TC(I)+SR(I)/1.9069                                         THERA147
      IF (IK - IS) 235,235,240                                           THERA148
235   FLAK(I)=VLAK(I)                                                    THERA149
      IFC(I)=IFC(I)                                                      THERA150
      RC(I)=TC(I)                                                        THERA151
      GO TO 255                                                          THERA152
240   DO 250 K=1,IS                                                      THERA153
      IF (IFC(K) + 1) 250,245,245                                        THERA154
245   VLAK(I)=VLAK(I)-VAU(I,K)*RC(K)                                     THERA155
      TC(I)=TC(I)-VAU(I,K)*RC(K)                                         THERA156
250   CONTINUE                                                           THERA157
255   I=I+1                                                              THERA158
      NCV=-IABS(NCV)                                                     THERA159
      IF (MODE-1) 310,311,310                                                  *COR
311   IF (TFMAX-T) 312,310,310                                                 *COR
312   T=TFMAX                                                                  *COR
      IF (T-500.) 313,313,5                                                    *COR
313   WRITE(6,99)                                                              *COR
      STOP                                                               THERA165  **-5
311   IF (ITS) 314,315,314                                                     *COR
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```
  315 AA=P*HP                                                    *COR
      UCV=0                                         THER0168     **-2
      RUCH=ROUCH                                                 *COR
      INF=0                                                      *COR
      NUT=0                                                      *COR
      MS = 5                                                     *COR
      IF (KR(9)-5) 335,411,411                                   *COR
  411 DO 607 M=1,8                                               *COR
      DO 608 IZ=1,4                                              *COR
      PMU(IZ,M)=0.0                                              *COR
      RMU(IZ,M)=0.0                                              *COR
      NMR(IZ,M)=1                                                *COR
  608 NMP(IZ,M)=1                                                *COR
      DO 607 IZ=1,8                                              *COR
      NPP(IZ,M)=1                                                *COR
      PSI(IZ,M)=0.0                                              *COR
      FKK(IZ,M)=0.0                                              *COR
      FNAM(1,IZ+8)=BLLK                                          *COR
      FNAM(1,IZ+16)=BLLK                                         *COR
  607 NPF(IZ,M)=1                                                *COR
  603 FORMAT(8X,2A4,32HSPECIES NOT FOUND IN THERMO DATA)         *COR
      IF (KRK(8)-4) 413,414,414                                  *COR
  414 II=1                                                       *COR
      MR=3                                                       *COR
      IRY=1                                                      *COR
C*****H2O+C*==CO+H2*****                                         *COR
      RMU(1,1)=1.0                                               *COR
      RMU(2,1)=1.0                                               *COR
      PMU(1,1)=1.0                                               *COR
      PMU(2,1)=1.0                                               *COR
      II=2                                                       *COR
      GO TO 421                                                  *COR
  413 IF (KRK(8)-2) 416,415,416                                  *COR
  415 II=1                                                       *COR
      MR=1                                                       *COR
      IRY=2                                                      *COR
C*****CO2+C*==2CO*****                                           *COR
  421 RMU(1,II)=1.0                                              *COR
      RMU(2,II)=1.0                                              *COR
      PMU(1,II)=2.0                                              *COR
      IF (MR .EQ. 1) GO TO 417                                   *COR
      II=3                                                       *COR
      GO TO 422                                                  *COR
  416 II=1                                                       *COR
      MR=1                                                       *COR
      IRY=3                                                      *COR
C*****H2+2C*==C2H2*****                                          *COR
  422 RMU(1,II)=1.0                                              *COR
      RMU(2,II)=2.0                                              *COR
      PMU(1,II)=1.0                                              *COR
  417 DO 418 I=1,MS                                              *COR
      SUBC=FLOAT(I)                                              *COR
      RMU(1,I+MR)=SUBC                                           *COR
  418 PMU(1,I+MR)=1.0                                            *COR
      MT=MR+MS                                                   *COR
      NICK=KRK(4)                                                *COR
      IF (KRK(7)) 701,702,701                                    *COR
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      701 IF (KRK(7)-2) 756,702,756                                     *COR
      702 IF (KRK(8)-4) 703,706,706                                     *COR
      703 IF (KRK(8)-2) 705,704,705                                     *COR
      704 FKF(1)=FKFD(2,NICK)/RUCM                                      *COR
          EAK(1)=EAKD(2,NICK)                                           *COR
          EXK(1)=EXKD(2,NICK)                                           *COR
          GO TO 707                                                     *COR
      705 FKF(1)=FKFD(3,NICK)/RUCM                                      *COR
          EAK(1)=EAKD(3,NICK)                                           *COR
          EXK(1)=EXKD(3,NICK)                                           *COR
          GO TO 707                                                     *COR
      706 DO 708 I=1,MR                                                 *COR
          FKF(I)=FKFD(I,NICK)/RUCM                                      *COR
          EAK(I)=EAKD(I,NICK)                                           *COR
      709 EXK(I)=EXKD(I,NICK)                                           *COR
C*****SUBLIMATION KINETICS*****                                         *COR
      707 DO 709 M=1,MS                                                 *COR
          FKF(M+MR)=FSS(M)/RUCM                                         *COR
          EAK(M+MR)=0.0                                                 *COR
      709 EXK(M+MR)=-0.5                                                *COR
      756 IF (KRK(7)-2) 711,716,716                                     *COR
      711 IF (KRK(8)-4) 712,715,715                                     *COR
      712 IF (KRK(8)-2) 714,713,714                                     *COR
      713 DO 717 II=1,8                                                 *COR
          PST(II,1)=PSID(II,2,NICK)                                     *COR
      717 FKK(II,1)=FKKD(II,2,NICK)                                     *COR
          GO TO 716                                                     *COR
      715 DO 718 I=1,MR                                                 *COR
          DO 718 II=1,8                                                 *COR
          PST(II,I)=PSID(II,I,NICK)                                     *COR
      718 FKK(II,I)=FKKD(II,I,NICK)                                     *COR
          GO TO 716                                                     *COR
      714 DO 719 II=1,8                                                 *COR
          PST(II,1)=PSID(II,3,NICK)                                     *COR
      719 FKK(II,1)=FKKD(II,3,NICK)                                     *COR
      716 IF (KRK(7)) 752,752,721                                       *COR
      721 IF (KRK(7)-2) 722,752,722                                     *COR
      722 DO 723 M=1,MT                                                 *COR
          READ(KIN,724) FKF(M),EAK(M),EXK(M)                            *COR
      724 FORMAT(3E10.4)                                                *COR
      723 FKF(M)=FKF(M)/RUCM                                            *COR
      752 IF (KRK(7)-1) 727,727,725                                     *COR
      725 DO 726 M=1,MR                                                 *COR
          READ(KIN,728) (PST(J,M),J=1,8)                                *COR
      726 READ(KIN,728) (FKK(J,M),J=1,8)                                *COR
      728 FORMAT(8E10.0)                                                *COR
      727 MRS=MR                                                        *COR
          M=0                                                           *COR
      423 DO 426 MM=1,MRS                                               *COR
          M=M+1                                                         *COR
          IF (M-MR) 424,424,425                                         *COR
      424 INP(M)=8                                                      *COR
          IMF=8                                                         *COR
          II=24                                                         *COR
          GO TO 427                                                     *COR
      425 II=8                                                          *COR
          INP(M)=24                                                     *COR
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      427 DO 600 IZ=1,IIZ                                                    *COR
          IF (IZ .GT. 4) GO TO 429                                           *COR
          ENAM(1,IZ)=PXSP(M,IZ)                                              *COR
          GO TO 428                                                          *COR
      429 IF (IZ .GT. 8) GO TO 430                                           *COR
          ENAM(1,IZ)=PRSP(M,IZ-4)                                            *COR
          GO TO 428                                                          *COR
      430 IF (IZ .GT. 16) GO TO 431                                          *COR
          ENAM(1,IZ)=IUBS(IZ-8)                                              *COR
          GO TO 428                                                          *COR
      431 ENAM(1,IZ)=POIS(IZ-16)                                             *COR
      428 ENAM(2,IZ)=BLK                                                     *COR
          IF(ENAM(1,IZ).EQ.BLK) GO TO 600                                    *COR
          DO 601 J=1,N                                                       *COR
          IF(EANDA(J).NE.ENAM(1,IZ)) GO TO 601                               *COR
          IF(EANDH(J).EQ.ENAM(2,IZ)) GO TO 602                               *COR
      601 CONTINUE                                                           *COR
          IF (IZ-8) 731,731,732                                              *COR
      732 IF (IZ-16) 733,733,734                                             *COR
      733 PSI(IZ-8,M)=0.0                                                    *COR
          GO TO 600                                                          *COR
      734 PKK(IZ-16,M)=0.0                                                   *COR
          GO TO 600                                                          *COR
      731 CONTINUE                                                           *COR
          WRITE(KOUT,603) ENAM(1,IZ),ENAM(2,IZ)                              *COR
          STOP                                                               *COR
      602 IF(IZ.GT.4) GO TO 604                                              *COR
          NMP(IZ,M)=J                                                        *COR
          GO TO 600                                                          *COR
      604 IF(IZ.GT.8) GO TO 605                                              *COR
          NMP(IZ-4,M)=J                                                      *COR
          GO TO 600                                                          *COR
      605 IF(IZ.GT.16) GO TO 606                                             *COR
          NPP(IZ-8,M)=J                                                      *COR
          GO TO 600                                                          *COR
      606 NPP(IZ-16,M)=J                                                     *COR
      600 CONTINUE                                                           *COR
          IF (MRS .EQ. 1) GO TO 735                                          *COR
      426 CONTINUE                                                           *COR
          GO TO 736                                                          *COR
      735 MRS=0                                                              *COR
          IRY=4                                                              *COR
          GO TO 423                                                          *COR
      736 CONTINUE                                                           *COR
      265 FORMAT (///3X,32HTRANSFER COEFFICIENT RHOF*UE*CM=,E12.5//3X,7HKINET*COR
     *IC)                                                                    *COR
      270 FORMAT (3X,11HREACTION---,I7,4I10)                                 *COR
      275 FORMAT (/3X,8HREACTANT)                                            *COR
      280 FORMAT (5X,12HCOEFFICIENTS/)                                       *COR
      285 FORMAT (8X,2A4,F8.2,9F10.2)                                THER1460*COR
      300 FORMAT (/3X,19HPRE-EXPONENT FACTOR,   E10.3,4X,                    *COR
     *17HACTIVATION ENERGY,   F10.3,4X,10HT EXPONENT,E10.3,3I6//)            *COR
      295 FORMAT(8X,5(E8.2,2A4))                                             *COR
          WRITE(KOUT,265) RHOM                                               *COR
          DO 400 M=1,NT                                                      *COR
          WRITE(KOUT,270) M                                                  *COR
      710 FORMAT (8X,5(E8.2,2A4))                                            *COR
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      IF (M-  ) 401,401,402                                                    *COR
  401 I1=   (1, )                                                              *COR
      I2=  P(2, )                                                              *COR
      J1=  F(1, )                                                              *COR
      J2=MMP(2, )                                                              *COR
      WRITE(KOUT,290) RMU(1,M),FAMOA(I1),RMU(2,M),FAMOA(I2),RMU(1,M),          *COR
     *                 FAMOA(J1),RMU(2,M),FAMOA(J2)                            *COR
  290 FORMAT(/10X,F4.2,A4,1H+,F4.2,A4,4H-->,F4.2,A4,1H+,F4.2,A4)               *COR
      WRITE(KOUT,751)                                                          *COR
  751 FORMAT(/8X,16H  ITION TERMS/)                                            *COR
  741 FORMAT(/8X,15H DISONICS TERMS/)                                          *COR
      DO720 IZ=1,P                                                             *COR
      IF(ABS(PSI(IZ,M)).LT.1.E-6) GO TO 720                                    *COR
      I=MMP(IZ,M)                                                              *COR
      WRITE(KOUT,710) PSI(IZ,M),FAMOA(I),FAMOB(I)                              *COR
  720 CONTINUE                                                                 *COR
      WRITE(KOUT,741)                                                          *COR
      DO730 IZ=1,P                                                             *COR
      IF(ABS(FKK(IZ,M)).LT.1.E-6) GO TO 730                                    *COR
      I=NFF(IZ,M)                                                              *COR
      WRITE(KOUT,710) FKK(IZ,M),FAMOA(I),FAMOB(I)                              *COR
  730 CONTINUE                                                                 *COR
      GO TO 803                                                                *COR
  402 I=MMR(1,M)                                                               *COR
      J=MMP(1,M)                                                               *COR
      WRITE(KOUT,753) RMU(1,M),FAMOA(I),RMU(1,M),FAMOA(J)                      *COR
  753 FORMAT(/10X,F4.2,A4,3H-->,F4.2,A4)                                       *COR
  803 WRITE(KOUT,300) FKF(M),FAK(M),FXK(M),INP(M),INE,NUT                      *COR
  400 CONTINUE                                                                 *COR
      WRITE(KOUT,755)                                                          *COR
  755 FORMAT(1H1)                                                              *COR
  335 SUMN = SUMN / P                                           THER1710       *COR
                                                                               *COR
      SUML=ALOG(SUMN)                                           THER0263       *-63
      FFF=WTG/DUM2                                              THER0264
      WTG=WTG/SUMN                                              THER0265
      WTL=WTL/SUMN                                              THER0266
      DO 316 I=1,IS                                                            *COR
      PNUS(I)=PNUS(I)/SUMN                                      THER0268       **-1
  316 SLAM(I)=SLAM(I)/SUMN*FFF                                                 *COR
      WS=W(2)+W(3)                                              THER0270       **-1
      SUMC=1.0                                                  THER0271
      IF (KRALP+KR(2)) 314,314,320                                             *COR
  320 IF (WTL/WTG-WS) 314,314,321                                              *COR
  321 SUMC=0.                                                                  *COR
      IF (WS.EQ.0. .OR. WTG.EQ.0.) GO TO 314                                   *COR
      SUMC=WTL/(WTG*WS)                                         THER0276       **-4
      WTL=WTL/SUMC                                              THER0277
  314 RETURN                                                                   *COR
C                                                               THER0279       **-1
 435  FORMAT (////40H NO AVAILABLE SURFACE SPECIES. .  .STOP )  THER0280
      END                                                       THER0296       *-15
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      SUBROUTINE  KININ                                                 KINI0001
      DIMENSION KRA(10,33),WRA(3,33),ZA(33),PRA(33),TEA(8),TSA(15)      KINI0002
C                                                                       KINI0003
      REAL AFIA(1),AFIB(1),EFIN(1),TAU(10,10)                           KINI0004
      EQUIVALENCE (AFIA(1),A(1)), (AFIB(1),A(51)), (EFIN(1),A(101)),    KINI0005
     1(TAU(1),A(151))                                                   KINI0006
      DIMENSION TE(180),CIJ(180,1)                                      KINI0007
      DIMENSION X(1),VLAM(180,1)                                        KINI0008
C                                                                       KINI0009
      COMMON          FAMOA(180),FAMOB(180),RB(180,2),RC(180,2),        KINI0010
     1                RD(180,2),RE(180,2),RF(180,2),TU(180,2),VN(180),  KINI0011
     2                Y(180),WTN(180),VMU(180,10),EF(180),IFC(180),     KINI0012
     3                IP(180),CP(180),H(180),SH(180),TC(180),VLPK(180), KINI0013
     4                E(180),LAMI(180),GAMK(1,1)                        KINI0014
C                                                                       KINI0015
      COMMON /PARAM1/ KIN,KOUT,J4N,POL,NAB,IDC,N,KRX(3),KR(10),TILE(3), KINI0016
     1                TTMIN,TTMAX,VISC,PR(1)                            KINI0017
C                                                                       KINI0018
      COMMON /PARAM2/ WM,SCH,RHO,VEL,P1,REE,EEA,TS,ISP,P,T,SIP,HIP,     KINI0019
     1                EL,ENL,ELIQ,NQ,IEL,ISPQ,KRALP,CPE,IRE,IEP,AA,TTS, KINI0020
     2                IN,IL,IT,MODE,HMELT,SMELT,TMAX,TMIN,MELT,SUMN,    KINI0021
     3                SUML,JC,HG,CPG,SVA,SVB,SVC,SVD,SUMC,NXC,SA1,      KINI0022
     4                VMACH,KRZZ,SP1,GAM,THI,MX,DMCHI,HCH,MCV,TBT,      KINI0023
     5                IERZ,NOAT,SR1,IXG,SV1,KKJ,IXC,IXG,SH1,NOATC,      KINI0024
     6                SA2,EFF,WS,RV,CBF,VA,HOS,DUM1,DUM2,EP,IFCJC,      KINI0025
     7                ISP2,WTG,VMU2,WTL                                 KINI0026
C                                                                       KINI0027
      COMMON /ARRAYS/ A(16,16),B(16),W(3),XC(50),XG(50),ZKE(10),        KINI0028
     1                TL0(10),DMCLO(10),WALJP(10),EB(10),ALP(10),       KINI0029
     2                GAMH(10),GAMF(10),TG(10,3),TK(10,3),WAT(10),      KINI0030
     3                IR(10),IOAT(10),KAT(10),UN(10,10),EBL(10)         KINI0031
      EQUIVALENCE (TU(181),TE(1)), (VMU(1),CIJ(1))                      KINI0032
C                                                                       KINI0033
      COMMON /KINETX/ MT,FKF(50),EAK(50),FXK(50),PMU(10,50),PMU(10,50), KINI0034
     1                PMR(50),PKKK(50)                                  *COR
C                                                                       KINI0036
      EQUIVALENCE (B(1),X(1)), (GAMK(1),VLAM(1))                        KINI0037
C                                                                       KINI0038
      COMMON/CAPKIN/ KRK(10),ROUCM,NCC                                  KINI0039
      COMMON/CONCRD/ Z,GAMER,WR(3)                                      KINI0040
      COMMON/SICPG/ PERCT,SIPER,CPER                                    *COR
      DATA (TEA(I),I=1, 8)/500.,1000.,1500.,2000.,2500.,3000.,3500.,    KINI0041
     14000./                                                            KINI0042
      DATA (TSA(I),I=1,15)/1200.,1400.,1600.,1800.,2000.,2200.,2400.,   KINI0043
     112600.,2800.,3000.,3200.,3400.,3600.,3800.,4000./                 KINI0044
      DATA KTE,KTS/8,15/                                                KINI0045
    5 NCC=NCC+1                                                         KINI0046
      IF (NCC-1) 315,10,315                                             KINI0047
   10 READ (KIN,360)  KRK,Z,PR,ZE,PC,ROUCM,GAMER,TILE                   KINI0048
      IF (KRK(1)-8) 20,15,20                                            KINI0049
   15 KR(1)=8                                                           KINI0050
      GO TO 355                                                         KINI0051
   20 IF (KRK(4) .LT. 8) GO TO 33                                       *COR
      READ(KIN,32) PERCT                                                *COR
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      32 FORMAT(F10.0)                                                  *COR
         SIPER=.7005*PERCT                                              *COR
         CPER=1.-SIPER                                                  *COR
      ** IF (KRK(5)-2) 40,25,40                                         *COR
   25    KTF=0                                          KINI0053       **-1
   30    KTF=KTF+1                                      KINI0054
         READ (KIN,365)  TFA(KTF)                       KINI0055
         IF (TFA(KTF)) 30,35,30                         KINI0056
   35    KTF=KTF-1                                      KINI0057
   40    IF (KRK(6)-2) 60,45,60                         KINI0058
   45    KTS=0                                          KINI0059
   50    KTS=KTS+1                                      KINI0060
         READ (KIN,365)  TSA(KTS)                       KINI0061
         IF (TSA(KTS)) 50,55,50                         KINI0062
   55    KTS=KTS-1                                      KINI0063
   60    KR(7)=KRK(10)                                  KINI0064
         KR(8)=KRK(9)-1                                 KINI0065
         KR(9)=0                                        KINI0066
         IF (KRK(9)) 70,65,70                           KINI0067
   65    KR(10)=0                                       KINI0068
         GO TO 75                                       KINI0069
   70    KR(10)=1                                       KINI0070
   75    IF (KRK(3)) 85,80,85                           KINI0071
   80    KRA(3,1)=1                                     KINI0072
         GO TO 90                                       KINI0073
   85    KR(3,1)=KRK(3)                                 KINI0074
   90    KRKS=1                                         KINI0075
         KRKSS=0                                        KINI0076
         IF (KRK(3)-5) 100,95,100                       KINI0077
   95    KRK(3)=0                                       KINI0078
         KRA(3,1)=1                                     KINI0079
         KRKSS=2                                        KINI0080
         GO TO 115                                      KINI0081
  100    IF (KRK(3)-4) 115,105,110                      KINI0082
  105    KRKS=5                                         KINI0083
         GO TO 115                                      KINI0084
  110    KRKS=6                                         KINI0085
  115    KR(1,1)=KRK(2)                                 KINI0086
         KRA(2,1)=1                                     KINI0087
         KRA(4,1)=0                                     KINI0088
         KRA(9,1)=0                                     KINI0089
         KTC=7+KTF+KTS                                  KINI0090
         DO 120 I=1,KTC                                 KINI0091
         KRA(6,I)=KR(6)                                 KINI0092
         KRA(7,I)=KR(7)                                 KINI0093
         KRA(8,I)=KR(8)                                 KINI0094
         KRA(10,I)=KR(10)                               KINI0095
         XRA(1,I)=1.0                                   KINI0096
         SRA(2,I)=0.0                                   KINI0097
         ERA(3,I)=0.0                                   KINI0098
  120    CONTINUE                                       KINI0099
         ZA(1)=Z                                        KINI0100
         PRA(1)=PR                                      KINI0101
         IF (KRK(1)) 140,125,140                        KINI0102
  125    KRA(5,1)=0                                     KINI0103
         NCT=1                                                          *COR
         GO TO 215                                      KINI0117       *-12
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      140   IF (KRK(1)-2) 145,145,170                                 KINI0117
      145   KRA(5,1)=0                                                KINI0118
            KRA(1,2)=0                                                KINI0119
            KRA(2,2)=0                                                KINI0120
            KRA(3,2)=0                                                KINI0121
            KRA(4,2)=0                                                KINI0122
            KRA(5,2)=1                                                KINI0123
            KRA(9,2)=0                                                KINI0124
            ZA(2)=0.0                                                 KINI0125
            PRA(2)=0.0                                                KINI0126
            IF (KRK(1)-2) 155,150,155                                 KINI0127
      150   KRA(5,2)=3                                                KINI0128
        155 NCT=2                                                                    *COR
            GO TO 215                                                 KINI0141       *-12
      170   IF (KRK(1)-3) 190,175,190                                 KINI0142
      175   KRA(5,1)=2                                                KINI0143
            KRA(1,2)=1                                                KINI0144
            KRA(2,2)=0                                                KINI0145
            KRA(3,2)=0                                                KINI0146
            KRA(4,2)=0                                                KINI0147
            KRA(5,2)=1                                                KINI0148
            KRA(9,2)=0                                                KINI0149
            ZA(2)=0.0                                                 KINI0150
            PRA(2)=ZF                                                 KINI0151
            NCT=2                                                                    *COR
            GO TO 215                                                 KINI0164       *-12
      190   KRA(5,1)=2                                                KINI0165
            KRA(1,2)=1                                                KINI0166
            KRA(2,2)=0                                                KINI0167
            KRA(3,2)=0                                                KINI0168
            KRA(4,2)=0                                                KINI0169
            KRA(5,2)=1                                                KINI0170
            KRA(9,2)=0                                                KINI0171
            ZA(2)=0.0                                                 KINI0172
            PRA(2)=ZF                                                 KINI0173
            KRA(1,3)=0                                                KINI0174
            KRA(2,3)=0                                                KINI0175
            KRA(3,3)=0                                                KINI0176
            KRA(4,3)=0                                                KINI0177
            KRA(5,3)=1                                                KINI0178
            KRA(9,3)=0                                                KINI0179
            ZA(3)=0.0                                                 KINI0180
            PRA(3)=0.0                                                KINI0181
            IF (KRK(1)-5) 200,195,200                                 KINI0182
      195   KRA(5,3)=3                                                KINI0183
        200 NCT=3                                                                    *COR
      215   DO 220 I=1,NCT                                            KINI0196       *-12
      220   KRA(10,I)=0                                               KINI0197
            IF (KRK(5)) 225,235,225                                   KINI0198
      225   NCT1=NCT+1                                                KINI0199
            NCT2=NCT+KTF                                              KINI0200
            DO 230 I=NCT1,NCT2                                        KINI0201
            KRA(1,I)=0                                                KINI0202
            KRA(2,I)=0                                                KINI0203
            KRA(3,I)=0                                                KINI0204
            KRA(4,I)=0                                                KINI0205
            KRA(5,I)=0                                                KINI0206
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```
      KRA(9,I)=0                                                        KINI0207
      ZA(I)=-TFA(I-NCT)                                                 KINI0208
      PRA(I)=0.0                                                        KINI0209
230   CONTINUE                                                          KINI0210
      KRA(3,NCT1)=KRKSS                                                 KINI0211
      NCT3=NCT2+1                                                       KINI0212
      NCT4=NCT2+KTS                                                     KINI0213
      GO TO 240                                                         KINI0214
235   NCT3=NCT+1                                                        KINI0215
      NCT4=NCT+KTS                                                      KINI0216
240   IF (KRK(6)) 245,240,245                                           KINI0217
245   NCT5=NCT3+1                                                       KINI0218
      DO 250 I=NCT3,NCT5                                                KINI0219
      KRA(1,I)=0                                                        KINI0220
      KRA(2,I)=0                                                        KINI0221
      KRA(3,I)=0                                                        KINI0222
      KRA(4,I)=3                                                        KINI0223
      KRA(5,I)=0                                                        KINI0224
      KRA(9,I)=0                                                        KINI0225
      ZA(I)=500.0                                                       KINI0226
      PRA(I)=0.0                                                        KINI0227
      WRA(2,I)=1.0E-19                                                  *COR
250   CONTINUE                                                          KINI0229  **-1
      IF (KRK(5)) 260,255,260                                           KINI0230
255   KRA(3,NCT3)=KRKSS                                                 KINI0231
260   KRA(4,NCT5)=2                                                     KINI0232
      ZA(NCT5)=1000.0                                                   KINI0233
      NCT3=NCT3+2                                                       KINI0234
      NCT4=NCT4+2                                                       KINI0235
      DO 275 I=NCT3,NCT4                                                KINI0236
      KRA(1,I)=5                                                        KINI0237
      KRA(2,I)=0                                                        KINI0238
      KRA(3,I)=0                                                        KINI0239
      KRA(4,I)=2                                                        KINI0240
      KRA(5,I)=0                                                        KINI0241
      ZA(I)=TSA(I-NCT3+1)                                               KINI0242
      PRA(I)=0.0                                                        KINI0243
      IF (KRK(8)-1) 265,265,270                                         KINI0244
265   KRA(9,I)=0                                                        KINI0245
      GO TO 275                                                         KINI0246
270   KRA(9,I)=4                                                        KINI0247
275   CONTINUE                                                          KINI0248
      IF (KRK(8)-1) 285,285,280                                         KINI0249
280   KRA(9,NCT4)=6                                                     KINI0250
285   NCT3=NCT4+1                                                       KINI0251
290   CONTINUE                                                          KINI0252
      IF (PC) 295,315,295                                               KINI0253
295   DO 305 I=1,NCT2                                                   KINI0254
      K=NCT3+2-I                                                        KINI0255
      DO 300 J=1,10                                                     KINI0256
300   KRA(J,K)=KRA(J,K-1)                                               KINI0257
      ZA(K)=ZA(K-1)                                                     KINI0258
      PRA(K)=PRA(K-1)                                                   KINI0259
      WRA(1,K)=WRA(1,K-1)                                               KINI0260
      WRA(2,K)=WRA(2,K-1)                                               KINI0261
305   WRA(3,K)=WRA(3,K-1)                                               KINI0262
      DO 310 I=1,10                                                     KINI0263
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      310   KRA(I,1)=KRA(I,2)                                                 KINI0264
            KRA(1,2)=2                                                        KINI0265
            KRA(2,2)=0                                                        KINI0266
            KRA(3,2)=0                                                        KINI0267
            ZA(2)=0.0                                                         KINI0268
            KRA(5,1)=0                                                        KINI0269
            ZA(1)=Z                                                           KINI0270
            PRA(1)=PC                                                         KINI0271
            NCT3=NCT3+1                                                       KINI0272
      315   IF (NCC-NCT3) 325,320,320                                         KINI0273
      320   NCC=0                                                             KINI0274
            GO TO 5                                                           KINI0275
      325   DO 330 I=1,10                                                     KINI0276
            KK(I)=KRA(I,NCC)                                                  KINI0277
      330   CONTINUE                                                          KINI0278
            Z=ZA(NCC)                                                         KINI0279
            PP=PRA(NCC)                                                       KINI0280
            VR(1)=VRA(1,NCC)                                                  KINI0281
            VR(2)=VRA(2,NCC)                                                  KINI0282
            VR(3)=VRA(3,NCC)                                                  KINI0283
            IF (KK(4)) 355,355,335                                            KINI0284
      335   DO 345 I=TSP,N                                                    KINI0285
            IF ((IFC(I)/3)*3-IFC(I)) 340,345,340                              KINI0286
      340   NS=I-1                                                            KINI0287
            GO TO 350                                                         KINI0288
      345   CONTINUE                                                          KINI0289
            GO TO 355                                                         KINI0290
      350   VM(NS+1)=VM(N+1)                                                  KINI0291
            TF(NS+1)=TF(N+1)                                                  KINI0292
            IFC(NS+1)=IFC(N+1)                                                KINI0293
            WTM(NS+1)=WTM(N+1)                                                KINI0294
            FAMOA(NS+1)=FAMOA(N+1)                                            KINI0295
            FAMOB(NS+1)=FAMOB(N+1)                                            KINI0296
            N=NS                                                              KINI0297
      355   RETURN                                                            KINI0298
      C                                                                       KINI0299
      360   FORMAT (1011,6F10.5,2A4,A2)                                       KINI0300
      365   FORMAT (F10.5)                                                    KINI0301
            END                                                               KINI0302
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      SUBROUTINE  ZIPIN                                                 ZIPI0001
C                                                                       ZIPI0002
      REAL NFIA(1),NFIB(1),FFIN(1),TAU(10,10)                           ZIPI0003
      EQUIVALENCE (NFIA(1),A(1)), (NFIB(1),A(51)), (FFIN(1),A(101)),    ZIPI0004
     1(TAU(1),A(151))                                                   ZIPI0005
      DIMENSION TF(180),CIJ(180,1)                                      ZIPI0006
      DIMENSION X(1),VLAM(180,1)                                        ZIPI0007
C                                                                       ZIPI0008
      COMMON           FANOA(180),FAMOM(180),RR(180,2),RC(180,2),       ZIPI0009
     1                 RD(180,2),RE(180,2),PE(180,2),TU(180,2),VN(180), ZIPI0010
     2                 Y(180),WTM(180),VMU(180,10),FF(180),IFC(180),    ZIPI0011
     3                 IP(180),CP(180),H(180),SH(180),TC(180),VLNK(180), ZIPI0012
     4                 E(180),LAMI(180),GAMK(1,1)                       ZIPI0013
C                                                                       ZIPI0014
      COMMON /PARAM1/ KIN,KOUT,JAN,MOL,NAP,IDC,N,KKX(3),KR(10),TILE(3), ZIPI0015
     1                TTMIN,TTMAX,VISC,PR(1)                            ZIPI0016
C                                                                       ZIPI0017
      COMMON /PARAM2/ WM,SCH,RHO,VEL,B1,AEE,EEA,IS,ISP,P,T,SIE,HIP,     ZIPI0018
     1                FL,FNL,FLIQ,NQ,IEL,ISPQ,KRALP,CPE,IRE,IER,AA,ITS, ZIPI0019
     2                IM,IL,IT,MODE,HMELT,SMELT,TMAX,TMIN,MELT,SUMN,    ZIPI0020
     3                SUML,JC,HG,CPG,SVA,SVB,SVC,SVD,SUMC,NXC,SA1,      ZIPI0021
     4                VMACH,KRZZ,SP1,GAM,THI,MX,DMCHT,HCH,NCV,IRT,      ZIPI0022
     5                IERZ,NOAT,SR1,IXG,SV1,KKJ,IXC,NXG,SH1,NOATO,      ZIPI0023
     6                SA2,EEE,WS,RV,CME,VA,ROS,DUM1,DUM2,EP,IECJC,      ZIPI0024
     7                ISP2,WTG,VMU2,WTL                                 ZIPI0025
C                                                                       ZIPI0026
      COMMON /ARRAYS/ A(16,16),B(16),W(3),XC(50),XG(50),ZKF(10),        ZIPI0027
     1                TLQ(10),DMCLQ(10),WALJP(10),FB(10),ALP(10),       ZIPI0028
     2                GAMH(10),GAME(10),TQ(10,3),TK(10,3),WAT(10),      ZIPI0029
     3                IP(10),IOAT(10),KAT(10),UM(10,10),FBL(10)         ZIPI0030
      EQUIVALENCE (TU(101),TF(1)), (VMU(1),CIJ(1))                      ZIPI0031
C                                                                       ZIPI0032
      COMMON /KINETX/ MT,FKF(50),EAK(50),EXK(50),PMU(10,50),RMU(10,50), ZIPI0033
     1                PMP(50),PKKK(50)                                  ZIPI0034
C                                                                       ZIPI0035
      EQUIVALENCE (B(1),X(1)), (GAMK(1),VLAM(1))                        ZIPI0036
C                                                                       ZIPI0037
      COMMON/ACE1/GAMEX,REFM,PCH,ACHSQ,SQMAK,SXP                        ZIPI0038
C                                                                       ZIPI0039
      COMMON /DIFFER/ IC(11),ALPT(10),C(10),SORCE(8),RA(2),IN(10),      ZIPI0040
     1                II,KK,J,VINT,YINT,JAT(10),LIM(10,10),FANA(10),    ZIPI0041
     2                FAMB(10),KPHA(2)                                  ZIPI0042
C                                                                       ZIPI0043
      DIMENSION ATA(10),ATB(10),ATC(10)                                 ZIPI0044
      EQUIVALENCE (TQ(1),ATA(1)), (TQ(11),ATB(1)), (TQ(21),ATC(1))      ZIPI0045
C                                                                       ZIPI0046
      COMMON/CARKIN/ KPK(10),ROUGM,NCC                                  ZIPI0047
      COMMON/CONCRD/ Z,GAMER,WR(3)                                      ZIPI0048
      CALL  FTIME                                                       ZIPI0049
      NFF=0                                                             ZIPI0050
      TTMIN=300.                                                        ZIPI0051
      TTMAX=20000.                                                      ZIPI0052
      Z=0.0                                                             ZIPI0053
      PR=0.0                                                            ZIPI0054
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*COR
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      KKJ=0                                                              ZIPIn055
      PSV=P                                                              ZIPIn056
      II=0                                                               ZIPIn057
      IF (ITS + 1) 5,10,5                                                ZIPIn058
5     GAMEX=0.6666667                                                    ZIPIn059
      W(1)=1.0                                                           ZIPIn060
      W(2)=0.                                                            ZIPIn061
      W(3)=0.                                                            ZIPIn062
      MT=0                                                               ZIPIn063
      MX=-1                                                              ZIPIn064
      NCV=0                                                              ZIPIn065
      NOAT=0                                                             ZIPIn066
      WM=20.                                                             ZIPIn067
      T=3000.                                                                      *COR
      HIP=0.                                                             ZIPIn069  **-1
      SIP=0.                                                             ZIPIn070
      KR(10)=0                                                           ZIPIn071
10    ITS=0                                                              ZIPIn072
      IDC=1                                                              ZIPIn073
      KRALP=0                                                            ZIPIn074
      KKJ=0                                                              ZIPIn075
      WS=1.0                                                             ZIPIn076
      KR8=KR(8)                                                          ZIPIn077
      KR4=KR(4)                                                          ZIPIn078
      CALL  KININ                                                        ZIPIn079
      KKX(1)=KR(8)                                                       ZIPIn080
      WRITE (KOUT,290) TITLE,KR                                          ZIPIn081
      KR(8)=0                                                            ZIPIn082
      KRZZ=0                                                             ZIPIn083
      TET=501.                                                           ZIPIn084
      KR(8)=KR(4)-1                                                      ZIPIn085
      IF (KR(4)) 20,15,15                                                ZIPIn086
15    IF (KR(6)) 25,25,20                                                ZIPIn087
20    KR(6)=KR(6)-1                                                      ZIPIn088
25    IF (KR(7)) 35,45,30                                                ZIPIn089
30    KR(7)=5*(KR(7) - 1)+1                                              ZIPIn090
35    IF (ABS(WR(1)) + ABS(WR(2)) + ABS(WR(3))) 45,45,40                 ZIPIn091
40    W(1)=WR(1)                                                         ZIPIn092
      W(2)=WR(2)                                                         ZIPIn093
      W(3)=WR(3)                                                         ZIPIn094
      KRALP=1                                                            ZIPIn095
45    CONTINUE                                                           ZIPIn096
      IF (KR(1) - 5) 55,50,55                                            ZIPIn097
50    KR(1)=0                                                            ZIPIn098
      KR(8)=1                                                            ZIPIn099
55    MODE=KR(1)                                                         ZIPIn100
      KRALP=KRALP+IABS(KR8-KR(8))+IABS(KR4-KR(4))                        ZIPIn101
      SVA=0.                                                             ZIPIn102
      SVR=0.                                                             ZIPIn103
      IERZ=0                                                             ZIPIn104
      IF (MODE - 8) 65,60,65                                             ZIPIn105
60    STOP                                                               ZIPIn106
65    IF (GAMER) 70,95,70                                                ZIPIn107
70    GAMER=SIGN(AMAX1(ABS(GAMER),0.0001),GAMER)                         ZIPIn108
      IF (KR(3)) 80,80,75                                                ZIPIn109
75    IF (KR(3)-9) 90,80,90                                              ZIPIn110
80    J=1                                                                ZIPIn111
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112.            DO 85 IK=1,N                                                    ZIPI0112
113.            FF(J)=FF(J)**(GAMER/GAMEX)                                      ZIPI0113
114.      85    J=J+1                                                           ZIPI0114
115.      90    GAMEX=GAMER                                                     ZIPI0115
116.      95    IF (Z) 120,100,120                                              ZIPI0116
117.     100    IF (MODE-4) 105,155,270                                         ZIPI0117
118.     105    IF (MODE-3) 270,110,270                                         ZIPI0118
119.     110    IF (KR(5)) 270,270,115                                          ZIPI0119
120.     115    SIP=SXP                                                         ZIPI0120
121.            GO TO 270                                                       ZIPI0121
122.     120    IF (MODE - 1) 125,125,140                                       ZIPI0122
123.     125    T=Z                                                             ZIPI0123
124.            IF (T) 130,135,135                                              ZIPI0124
125.     130    T=-T                                                            ZIPI0125
126.            IFBZ=1                                                          ZIPI0126
127.     135    CONTINUE                                                        ZIPI0127
128.            GO TO 270                                                       ZIPI0128
129.     140    IF (MODE - 2) 270,255,145                                       ZIPI0129
130.     145    IF (MODE-4) 260,150,260                                         ZIPI0130
131.     150    T=Z                                                             ZIPI0131
132.     155    MODE=2                                                          ZIPI0132
133.            KKJ=-1                                                          ZIPI0133
134.            KK(5)=MAX0(KK(5),1)                                             ZIPI0134
135.            KK(1)=2                                                         ZIPI0135
136.            READ (KIN,295) KVL,UR,HTP,HSR,RHOR,SA1,PR1                      ZIPI0136
137.            RHOR=-9999.                                                     ZIPI0137
138.            PR1=-9999.                                                      ZIPI0138
139.            IF (UR) 165,170,160                                             ZIPI0139
140.     160    SV1=UR                                                          ZIPI0140
141.            GO TO 170                                                       ZIPI0141
142.     165    SV1=VEL                                                         ZIPI0142
143.     170    IF (HTP) 175,180,175                                            ZIPI0143
144.     175    HCH=HTP/1.8                                                     ZIPI0144
145.     180    IF (HSR) 185,200,185                                            ZIPI0145
146.     185    IF (HSR + 9999.) 190,195,190                                    ZIPI0146
147.     190    SH1=HSR/1.8                                                     ZIPI0147
148.            GO TO 200                                                       ZIPI0148
149.     195    SH1=HTP                                                         ZIPI0149
150.     200    IF (RHOR) 210,215,205                                           ZIPI0150
151.     205    SR1=RHOR                                                        ZIPI0151
152.            GO TO 215                                                       ZIPI0152
153.     210    SR1=RHO                                                         ZIPI0153
154.     215    IF (PR1) 225,230,220                                            ZIPI0154
155.     220    SP1=PR1                                                         ZIPI0155
156.            GO TO 230                                                       ZIPI0156
157.     225    SP1=P                                                           ZIPI0157
158.     230    GO TO (235,240,245), KVL                                        ZIPI0158
159.     235    SV1=SQRT( (HCH - SH1) * 90108.)                                 ZIPI0159
160.            GO TO 250                                                       ZIPI0160
161.     240    HCH=SH1+SV1/90108.*SV1                                          ZIPI0161
162.            GO TO 250                                                       ZIPI0162
163.     245    SH1=HCH-SV1/90108.*SV1                                          ZIPI0163
164.     250    SA1=SA1/57.29577                                                ZIPI0164
165.            SVA=(1.3146 * SR1 * SV1 * COS(SA1))**2./90108.                  ZIPI0165
166.            SVB=SVA*2./1.9869                                               ZIPI0166
167.            SVC=(SV1 * COS(SA1))**2./90108.+SH1                             ZIPI0167
168.            SVD=SP1+SVB/(1.3146 * SR1)                                      ZIPI0168
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169.            P=SVD                                                                   ZIPIn169
170.            GO TO 270                                                               ZIPIn170
171.      255   HIP=Z                                                                   ZIPIn171
172.            GO TO 270                                                               ZIPIn172
173.      260   SIP=Z                                                                   ZIPIn173
174.            IF (SIP + 9999.) 270,265,270                                            ZIPIn174
175.      265   SIP=SCH                                                                 ZIPIn175
176.            SCHAK=0.                                                                ZIPIn176
177.            PSV=PCH                                                                 ZIPIn177
178.      270   IF (PR) 275,285,280                                                     ZIPIn178
179.      275   KKJ=1                                                                   ZIPIn179
180.            ACHSQ=PR*PR                                                             ZIPIn180
181.            GAME=GAM-1.0                                                            ZIPIn181
182.            PR=PSV*((1.+GAME/2.*SCHAK)/(1.+GAME/2.*ACHSQ))**(GAM/GAME)              ZIPIn182
183.            KR(5)=1                                                                 ZIPIn183
184.      280   P=PR                                                                    ZIPIn184
185.      285   AA=P*WM                                                                 ZIPIn185
186.            RETURN                                                                  ZIPIn186
187.      C                                                                             ZIPIn187
188.      290   FORMAT  (1H19X35HGRAPHITE SURFACE KINETICS (GASKET) 2A4,A2,5X10I1)      ZIPIn188
189.      295   FORMAT  (T1,F9.4,5F10.4)                                                ZIPIn189
190.            END                                                                     ZIPIn190
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      SUBROUTINE AFMAT                                                  AFMA0001
C                                                                       AFMA0002
      REAL NFIA(1),NFIB(1),FFIN(1),TAU(10,10)                           AFMA0003
      EQUIVALENCE (NFIA(1),A(1)), (NFIB(1),A(51)), (FFIN(1),A(101)),    AFMA0004
     1(TAU(1),A(151))                                                   AFMA0005
      DIMENSION TF(180),CIJ(180,1)                                      AFMA0006
      DIMENSION X(1),VLAM(180,1)                                        AFMA0007
C                                                                       AFMA0008
      COMMON           FAMOA(180),FAMOR(180),RB(180,2),RC(180,2),       AFMA0009
     1                 RD(180,2),RE(180,2),RF(180,2),TU(180,2),VN(180), AFMA0010
     2                 Y(180),WTM(180),VNU(180,10),FF(180),IFC(180),    AFMA0011
     3                 IP(180),CP(180),H(180),SB(180),TC(180),VLNK(180), AFMA0012
     4                 E(180),LAMT(180),GAMK(1,1)                       AFMA0013
C                                                                       AFMA0014
      COMMON /PARAM1/ KIN,KOUT,JAN,MOL,NAB,IDC,N,KKX(3),KR(10),TILE(3), AFMA0015
     1                TTMIN,TTMAX,VISC,PR(1)                            AFMA0016
C                                                                       AFMA0017
      COMMON /PARAM2/ WM,SCH,RHO,VEL,B1,NFF,FFA,IS,ISP,P,T,SIP,HIP,     AFMA0018
     1                EL,ENL,FLIQ,NO,IFL,ISPQ,KRALP,CPF,IRE,IER,AA,ITS, AFMA0019
     2                IN,IL,IT,MODE,HMELT,SMELT,TMAX,TMIN,MELT,SUMN,    AFMA0020
     3                SUML,JC,HG,CPG,SVA,SVP,SVC,SVD,SUMC,NXC,SA1,      AFMA0021
     4                VMACH,KRZZ,SP1,GAM,THI,MX,DMCHI,HCH,NCV,TBT,      AFMA0022
     5                IFRZ,NOAT,SR1,IXG,SV1,KKJ,IXC,NXG,SH1,NOATO,      AFMA0023
     6                SA2,FFF,WS,RV,CMF,VA,HOS,DUM1,DUM2,EP,IFCJC,      AFMA0024
     7                ISP2,WTG,VMU2,WTL                                 AFMA0025
C                                                                       AFMA0026
      COMMON /ARRAYS/ A(16,16),B(16),W(3),XC(50),XG(50),ZKE(10),        AFMA0027
     1                TLO(10),DMCLO(10),WALJP(10),FB(10),ALP(10),       AFMA0028
     2                GAMH(10),GAMF(10),TQ(10,3),TK(10,3),WAT(10),      AFMA0029
     3                IP(10),IOAT(10),KAT(10),UM(10,10),EBL(10)         AFMA0030
      EQUIVALENCE (TU(181),TF(1)), (VNU(1),CIJ(1))                      AFMA0031
C                                                                       AFMA0032
      COMMON /KINETX/ MT,FKF(50),EAK(50),EXK(50),PNU(10,50),PMU(10,50), AFMA0033
     1                PMR(50),PKKK(50)                                  *COR
C                                                                       AFMA0035 **-1
      EQUIVALENCE (B(1),X(1)), (GAMK(1),VLAM(1))                        AFMA0036
C                                                                       AFMA0037
      COMMON /DIFFER/ IR(11),PNU(10),PNUS(10),SLAM(10),BE(10),BY(10),   AFMA0038
     1                IRC(10),JJ(10),SLB(16),SLA(16,16)                 AFMA0039
C                                                                       AFMA0040
C     IF TRYING TO PUSH THROUGH TMIN OR TMAX -- REINVERT AND DT TO ZERO AFMA0041
      IF (ITS-NCV-1) 5,5,10                                             AFMA0042
5     DTU=1000.                                                         AFMA0043
      DTD=DTU                                                           AFMA0044
      TTMIN=300.                                                        AFMA0045
      TTMAX=20000.                                                      AFMA0046
10    CONTINUE                                                          AFMA0047
      X1=X(1)                                                           AFMA0048
      IF (T - TMIN) 15,15,20                                            AFMA0049
15    IF (X(1)) 95,30,20                                                AFMA0050
20    IF (T - TMAX) 30,25,25                                            AFMA0051
25    IF (X(1)) 30,30,95                                                AFMA0052
C     IF NEW CONDENSED HAS NEG CORRECTION, DELETF AFTER REINVERT        AFMA0053
30    IF (IER) 65,65,35                                                 AFMA0054
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55.     35    IF (VN(IRF)) 40,40,65                                                  AFMA0055
56.     40    IF (X(IER) + 1.E-30) 45,65,65                                          AFMA0056
57.     45    IF (IRE-N) 55,55,50                                                    AFMA0057
58.     50    JC=0                                                                   AFMA0058
59.     55    CALL SWAP (A,B,SLA,SLB)                                                AFMA0059
60.           DO 60 I=1,ISPQ                                                         AFMA0060
61.           A(I,IER)=0.                                                            AFMA0061
62.     60    A(IER,I)=0.                                                            AFMA0062
63.           A(IER,IER)=1.E30                                                       AFMA0063
64.           B(IER)=-0.1                                                            AFMA0064
65.           IF (DUM1) 175,190,190                                                  AFMA0065
66.     C     IF S.E. ERROR AND CORRECTION ON T OF CONFLICTING SIGN,REINVERT         AFMA0066
67.     65    IF (MODE - 1) 160,70,165                                               AFMA0067
68.     70    IF (X(1) + B1) 95,75,75                                                AFMA0068
69.     C     ON S.E. IF DELTA LN T .GT. .9 REINVERT NO DT IF EL AND ENL ARE SMAAFMA0069
70.     75    IF (ABS(X(1)) - 0.9) 165,165,80                                        AFMA0070
71.     80    IF (ENL - 0.02) 85,90,90                                               AFMA0071
72.     85    IF (EL - 100.) 165,90,90                                               AFMA0072
73.     90    MODE=0                                                                 AFMA0073
74.     C     REINVERT                                                               AFMA0074
75.     95    CALL SWAP (A,B,SLA,SLB)                                                AFMA0075
76.     C     IF CONVERGED EXCEPT FOR T ON H OR S OPTIONS  --  NON CONVERGENT        AFMA0076
77.           IF (MODE - 1) 155,105,100                                              AFMA0077
78.     100   IF (EL + 100. * ENL - 1.E - 4) 205,205,155                            AFMA0078
79.     C     ON S.E. OPTION RESULTIN IN CONFLICTING ERROR/CORRECTION OR T PUSH AFMA0079
80.     C     IF OTHER BALANCES RELATIVELY GOOD, SET T TO TMIN/TMAX AS PER ERRORAFMA0080
81.     C     AND GO TO THERM (IF T ALREADY THERE - NONCONVERGE) ELSE DT TO ZEROAFMA0081
82.     105   IF (ABS(B1) - 100. * (EL + ENL)) 155,110,110                         AFMA0082
83.     110   TTMIN=AMAX1(TTMIN-DTD,300.)                                          AFMA0083
84.           TTMAX=AMIN1(TTMAX+DTU,20000.)                                          AFMA0084
85.           IF (X1*B1) 115,155,145                                                 AFMA0085
86.     115   IF (B1) 120,120,130                                                    AFMA0086
87.     120   IF (T-TMIN) 200,200,125                                                AFMA0087
88.     125   T=AMAX1(TMIN,T-DTD)                                                    AFMA0088
89.           TTMAX=T                                                                AFMA0089
90.           DTU=DTD/2.                                                             AFMA0090
91.           GO TO 195                                                              AFMA0091
92.     130   IF (T-TMAX) 135,200,200                                                AFMA0092
93.     135   T=AMIN1(TMAX,T+DTU)                                                    AFMA0093
94.           TTMIN=T                                                                AFMA0094
95.           DTD=DTU/2.                                                             AFMA0095
96.           IF (ABS(T - TF(JC)) - .001) 140,195,195                                AFMA0096
97.     140   IFC(JC)=1                                                              AFMA0097
98.           VN(JC)=1.E-3/WTM(JC)*WTG                                               AFMA0098
99.           Y(JC)=0.                                                               AFMA0099
100.          GO TO 195                                                              AFMA0100
101.    145   IF (T-TTMIN) 200,200,150                                               AFMA0101
102.    150   IF (T-TTMAX) 155,200,200                                               AFMA0102
103.    155   X(1)=0.                                                                AFMA0103
104.          MODE=0                                                                 AFMA0104
105.          TMIN=TTMIN                                                             AFMA0105
106.          TMAX=TTMAX                                                             AFMA0106
107.          IN=IN-1                                                                AFMA0107
108.          IL=2                                                                   AFMA0108
109.          GO TO 190                                                              AFMA0109
110.    160   X(1)=0.                                                                AFMA0110
111.    165   IF (X(2) + 1.) 170,210,210                                             AFMA0111
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112.     170   CALL SWAP (A,B,SLA,SLB)                                          AFMA0112
113.     175   X(2)=WTG                                                         AFMA0113
114.           IF (NP(6)) 180,185,185                                           AFMA0114
115.     180   X(2)=X(2)+WTL                                                    AFMA0115
116.     185   X(2)=0.                                                          AFMA0116
117.           DUM1=-1.                                                         AFMA0117
118.           A(2,2)=1.E25                                                     AFMA0118
119.     190   NQ=1                                                             AFMA0119
120.           GO TO 215                                                        AFMA0120
121.     195   NQ=2                                                             AFMA0121
122.           GO TO 215                                                        AFMA0122
123.     200   JC=0                                                             AFMA0123
124.           WRITE (KOUT,220)                                                 AFMA0124
125.     205   NQ=3                                                             AFMA0125
126.           GO TO 215                                                        AFMA0126
127.     210   NQ=4                                                             AFMA0127
128.     215   RETURN                                                           AFMA0128
129.     C                                                                      AFMA0129
130.     220   FORMAT (//56H  SOLUTION TERMINATED WHEN TEMPERATURE LIMIT ENCOUNTAFMA0130
131.          1RED//)                                                          AFMA0131
132.           END                                                              AFMA0132
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      SUBROUTINE  ALPST                                                      ALPS0001
      COMMON/ACF1/GAMEX,REEM,PCH,ACHSQ,SQMAK,SXP                             ALPS0002
C                                                                            ALPS0003
      REAL NFIA(1),NFIB(1),FFIN(1),TAU(10,10)                                ALPS0004
      EQUIVALENCE (NFIA(1),A(1)), (NFIB(1),A(51)), (FFIN(1),A(101)),         ALPS0005
     1(TAU(1),A(151))                                                        ALPS0006
      DIMENSION TF(180),CIJ(180,1)                                           ALPS0007
      DIMENSION X(1),VLAM(180,1)                                             ALPS0008
C                                                                            ALPS0009
      COMMON          FAMOA(180),FAMOB(180),RB(180,2),RC(180,2),             ALPS0010
     1                RD(180,2),RE(180,2),RF(180,2),TU(180,2),VN(180),       ALPS0011
     2                Y(180),WTM(180),VNU(180,10),FF(180),IFC(180),          ALPS0012
     3                IP(180),CP(180),H(180),SB(180),TC(180),VLNK(180),      ALPS0013
     4                E(180),LAMI(180),GAMK(1,1)                             ALPS0014
C                                                                            ALPS0015
      COMMON /PARAM1/ KIN,KOUT,JAN,MOL,NAR,IDC,N,KKX(3),KR(10),TILE(3),      ALPS0016
     1                TTMIN,TTMAX,VISC,PR(1)                                 ALPS0017
C                                                                            ALPS0018
      COMMON /PARAM2/ WM,SCH,RHO,VEL,B1,NFF,FFA,IS,ISP,P,T,SIP,HIP,          ALPS0019
     1                EL,ENL,FLIQ,NQ,IFL,ISPQ,KRALP,CPF,IRE,IER,AA,ITS,      ALPS0020
     2                IN,IL,IT,MODE,HMELT,SMELT,TMAX,TMIN,MELT,SUMN,         ALPS0021
     3                SUML,JC,HG,CPG,SVA,SVB,SVC,SVD,SUMC,NXC,SA1,           ALPS0022
     4                VMACH,KRZZ,SP1,GAM,THI,MX,DMCHI,HCH,NCV,TBT,           ALPS0023
     5                IFRZ,NOAT,SR1,IXG,SV1,KKJ,IXC,NXG,SH1,NOATO,           ALPS0024
     6                SA2,FFF,WS,RV,CMF,VA,HOS,DUM1,DUM2,EP,IFCJC,           ALPS0025
     7                ISP2,WTG,VMU2,WTL                                      ALPS0026
C                                                                            ALPS0027
      COMMON /ARRAYS/ A(16,16),B(16),W(3),XC(50),XG(50),ZKE(10),             ALPS0028
     1                TLO(10),DMCLO(10),WALJP(10),EB(10),ALP(10),            ALPS0029
     2                GAMH(10),GAMF(10),TQ(10,3),TK(10,3),WAT(10),           ALPS0030
     3                IR(10),IOAT(10),KAT(10),UM(10,10),EBL(10)              ALPS0031
      EQUIVALENCE (TU(181),TF(1)), (VNU(1),CIJ(1))                           ALPS0032
C                                                                            ALPS0033
      COMMON /KINETX/ MT,FKF(50),EAK(50),EXK(50),PMU(10,50),RMU(10,50),      ALPS0034
     1                PMR(50),PKKK(50)                                                    *COR
C                                                                            ALPS0036    **-1
      EQUIVALENCE (B(1),X(1)), (GAMK(1),VLAM(1))                             ALPS0037
C                                                                            ALPS0038
      COMMON /DIFFER/ IC(11),ALPT(10),C(10),SORCE(8),RA(2),IM(10),           ALPS0039
     1                IT,KK,J,VINT,YINT,JAT(10),LIM(10,10),FAMA(10),         ALPS0040
     2                FAMB(10),KPHA(2)                                       ALPS0041
C                                                                            ALPS0042
      DIMENSION ATA(10),ATB(10),ATC(10)                                      ALPS0043
      EQUIVALENCE (TQ(1),ATA(1)), (TQ(11),ATB(1)), (TQ(21),ATC(1))           ALPS0044
C                                                                            ALPS0045
      DATA REED,FFAD/4HREEM,4HFFA /                                          ALPS0046
      DATA I5,I6,I7/2H  ,2H*N,2HFW/                                          ALPS0047
      TFMAX=20000.                                                           ALPS0048
      IF (KR(3) - 7) 5,10,10                                                 ALPS0049
5     IF (NFF) 145,145,20                                                    ALPS0050
10    INF=NFF                                                                ALPS0051
      READ (KIN,475)  NFF                                                    ALPS0052
      NFF=NFF+INF                                                            ALPS0053
      INF=INF+1                                                              ALPS0054
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      READ (KIN,455) (NFIA(I),NFIB(I),FFIN(I),I=INF,NFF)                ALPS0055
      KR(3)=9-KP(3)                                                     ALPS0056
      IF (NFIA(INF) - NFIB(INF)) 20,15,20                               ALPS0057
15    TFMAX=FFIN(INF)                                                   ALPS0058
      GO TO 30                                                          ALPS0059
20    INF=1                                                             ALPS0060
      IF (NFIA(1) - NFIB(1)) 30,25,30                                   ALPS0061
25    TFMAX=FFIN(1)                                                     ALPS0062
30    JL=0                                                              ALPS0063
      DO 50 I=1,NFF                                                     ALPS0064
      IF (NFFD-NFIA(I)) 40,35,40                                        ALPS0065
35    FFFF=FFIN(I)                                                      ALPS0066
      JL=JL+1                                                           ALPS0067
      GO TO 50                                                          ALPS0068
40    IF (FFAD-NFIA(I)) 50,45,50                                        ALPS0069
45    FFA=FFIN(I)                                                       ALPS0070
      JL=JL+1                                                           ALPS0071
50    CONTINUE                                                          ALPS0072
      IF (JL) 80,80,55                                                  ALPS0073
55    DO 75 J=1,N                                                       ALPS0074
      FF(J)=1.E+10                                                      ALPS0075
      IF (WTM(J)-.01) 75,75,60                                          ALPS0076
60    IF (IFC(J)) 65,70,65                                              ALPS0077
65    IF (IABS(IFC(J))-3) 75,70,75                                      ALPS0078
70    FF(J)=(WTM(J)/REFM)**(FFA*GAMEX)                                  ALPS0079
75    CONTINUE                                                          ALPS0080
      WRITE (KOUT,480)  FFFF,FFA                                        ALPS0081
      IF (NFF-JL) 145,145,80                                            ALPS0082
80    J=1                                                               ALPS0083
      WRITE (KOUT,460)                                                  ALPS0084
      NP=N+1                                                            ALPS0085
      DO 140 IK=1,NP                                                    ALPS0086
      T=1                                                               ALPS0087
      T1=I5                                                             ALPS0088
      I2=I5                                                             ALPS0089
      I3=I5                                                             ALPS0090
      I4=I5                                                             ALPS0091
      IF (IK-N) 85,85,105                                               ALPS0092
85    IF (IFC(J)) 90,105,90                                             ALPS0093
90    IF (IABS(IFC(J)) - 3) 95,105,95                                   ALPS0094
95    IF (TFMAX - 20000.) 100,105,105                                   ALPS0095
100   TF(J)=TFMAX                                                       ALPS0096
      I=0                                                               ALPS0097
      GO TO 125                                                         ALPS0098
105   IF (NFIA(I) - FAMOA(J)) 135,110,135                               ALPS0099
110   IF (NFIB(I) - FAMOB(J)) 135,115,135                               ALPS0100
115   IF (FFIN(I) - 100.) 130,120,120                                   ALPS0101
120   TF(J)=AMIN1(FFIN(I) ,TFMAX)                                       ALPS0102
125   WRITE (KOUT,465) FAMOA(J),FAMOB(J),TF(J),I1,I2                    ALPS0103
      T1=I6                                                             ALPS0104
      I2=I7                                                             ALPS0105
      GO TO 135                                                         ALPS0106
130   FF(J)=FFIN(I)                                                     ALPS0107
      WRITE (KOUT,470) NFIA(I),NFIB(I),FFIN(I),I3,I4                    ALPS0108
      FF(J)=FF(J)**GAMEX                                                ALPS0109
      I3=I6                                                             ALPS0110
      I4=I7                                                             ALPS0111
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112.    135   I=I+1                                                                  ALPS0112
113.          IF (I - NFF) 105,105,140                                               ALPS0113
114.    140   J=J+1                                                                  ALPS0114
115.    145   NFF=0                                                                  ALPS0115
116.          WS=1.0                                                                 ALPS0116
117.          IF (KR(6)) 165,150,150                                                 ALPS0117
118.    150   W(1)=0.                                                                ALPS0118
119.          IF (KR(4)) 160,160,155                                                 ALPS0119
120.    155   IF (KR(4) - 3) 170,160,170                                            ALPS0120
121.    160   W(1)=1.0                                                               ALPS0121
122.          GO TO 170                                                              ALPS0122
123.    165   WS=W(1)+W(2)+W(3)                                                      ALPS0123
124.    170   NOATO=NOAT                                                             ALPS0124
125.          NOAT=0                                                                 ALPS0125
126.          DUM1=0.                                                                ALPS0126
127.          DO 230 K=1,IS                                                          ALPS0127
128.          ALPH=(W(1) * TK(K,1) + W(2) * TK(K,2) + W(3) * TK(K,3))/WS             ALPS0128
129.          IF (ALPH) 175,175,230                                                  ALPS0129
130.    175   IF (KAT(K)-99) 185,180,185                                            ALPS0130
131.    180   IF (KR(6)) 230,225,225                                                ALPS0131
132.    185   IF (KR(6)) 225,190,205                                                ALPS0132
133.    190   IF (TK(K,1)) 195,195,230                                               ALPS0133
134.    195   IF (KR(8)) 225,225,200                                                 ALPS0134
135.    200   IF (TK(K,3)) 225,225,230                                               ALPS0135
136.    205   IF (NOATO) 220,220,210                                                 ALPS0136
137.    210   DO 215 KK=1,NOATO                                                      ALPS0137
138.          IF (IOAT(KK) - K) 215,225,215                                          ALPS0138
139.    215   CONTINUE                                                               ALPS0139
140.    220   CONTINUE                                                               ALPS0140
141.          GO TO 230                                                              ALPS0141
142.    225   NOAT=NOAT+1                                                            ALPS0142
143.          DUM1=DUM1-ALPH                                                         ALPS0143
144.          IOAT(NOAT)=K                                                           ALPS0144
145.    230   CONTINUE                                                               ALPS0145
146.          WS=WS*(1. + DUM1)                                                      ALPS0146
147.          DO 235 K=1,IS                                                          ALPS0147
148.          GAME(K)=0.                                                             ALPS0148
149.    235   ALP(K)=(W(1) * TQ(K,1) + W(2) * TQ(K,2) + W(3) * TQ(K,3))/WS          ALPS0149
150.          TEST=1.0                                                               ALPS0150
151.          IF (KR(6)) 315,245,240                                                 ALPS0151
152.    240   STOP 2222                                                              ALPS0152
153.    C     SURFACE MASS BALANCE PACKAGE GOES HERE                                 ALPS0153
154.    245   IF (KR(4) - 2) 290,250,290                                             ALPS0154
155.    250   IF (NCV+KR(3)) 255,255,330                                             ALPS0155
156.    255   PMU2=0.                                                                ALPS0156
157.          KR(4)=1                                                                ALPS0157
158.          DO 265 K=1,IS                                                          ALPS0158
159.          IF (WTM(K)-1.0) 265,260,260                                            ALPS0159
160.    260   VA=VN(K)/FF(K)                                                         ALPS0160
161.          ZKE(K)=VA                                                              ALPS0161
162.          PMU2=PMU2+VA*WTM(K)                                                    ALPS0162
163.    265   CONTINUE                                                               ALPS0163
164.          J=ISP                                                                  ALPS0164
165.          DO 280 IK=ISP,N                                                        ALPS0165
166.          IF (WTM(J)-1.0) 280,270,270                                            ALPS0166
167.    270   VA=VN(J)/FF(J)                                                         ALPS0167
168.          PMU2=PMU2+VA*WTM(J)                                                    ALPS0168
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169.          DO 275 K=1,IS                                          ALPS0169
170.    275   ZKE(K)=ZKF(K)+VA*VNU(J,K)                              ALPS0170
171.    280   J=J+1                                                  ALPS0171
172.          DO 285 K=1,IS                                          ALPS0172
173.    285   ZKE(K)=ZKF(K)/PMU2                                     ALPS0173
174.    290   DO 310 I=1,IS                                          ALPS0174
175.          K=-IR(I)                                               ALPS0175
176.          IF (KAT(I)-99) 295,300,295                             ALPS0176
177.    295   IF (W(1)) 305,305,310                                  ALPS0177
178.    300   ALP(K)=0.                                              ALPS0178
179.          GO TO 310                                              ALPS0179
180.    305   ALP(K)=ALP(K)+ZKF(K)                                   ALPS0180
181.    310   CONTINUE                                               ALPS0181
182.          TEST=1.+W(2)+W(3)                                      ALPS0182
183.    315   DO 320 K=1,IS                                          ALPS0183
184.    320   TEST=TEST-ALP(K)*WTM(K)                                ALPS0184
185.          IF (ABS(TEST) - .001) 335,335,325                      ALPS0185
186.    325   WRITE (KOUT,485) W                                     ALPS0186
187.          STOP                                                   ALPS0187
188.    330   WRITE (KOUT,490)                                       ALPS0188
189.          STOP                                                   ALPS0189
190.    335   IF (KR(3)) 340,340,400                                 ALPS0190
191.    340   IF (NOATO) 400,400,345                                 ALPS0191
192.    C     REINITIALIZE SPECIES                                   ALPS0192
193.    345   PIN=P/10.                                              ALPS0193
194.          PLOG=ALOG(PIN)                                         ALPS0194
195.          J=1                                                    ALPS0195
196.          DO 395 IK=1,N                                          ALPS0196
197.          IF (IFC(J) + 1) 350,395,360                            ALPS0197
198.    350   IFC(J)=IFC(J)+3                                        ALPS0198
199.          IF (J - IS) 370,370,355                                ALPS0199
200.    355   YC=0.                                                  ALPS0200
201.          GO TO 375                                              ALPS0201
202.    360   IF (IFC(J) - 1) 395,395,365                           ALPS0202
203.    365   IFC(J)=IFC(J)-3                                        ALPS0203
204.    370   YC=PLOG                                                ALPS0204
205.    375   IF (IFC(J)) 385,390,380                                ALPS0205
206.    380   IFC(J)=-1                                              ALPS0206
207.    385   VN(J)=0.                                               ALPS0207
208.          Y(J)=YC                                                ALPS0208
209.          GO TO 395                                              ALPS0209
210.    390   VN(J)=PIN                                              ALPS0210
211.          Y(J)=PLOG                                              ALPS0211
212.    395   J=J+1                                                  ALPS0212
213.    400   IF (NOAT) 450,450,405                                  ALPS0213
214.    405   J=1                                                    ALPS0214
215.          DO 430 IK=1,N                                          ALPS0215
216.          IF (NOAT - J) 425,410,410                              ALPS0216
217.    410   DO 420 L=1,NOAT                                        ALPS0217
218.          K=IOAT(L)                                              ALPS0218
219.          LAMT=LAMT(J)/2**(K - 1)                                ALPS0219
220.          LAMT=LAMT-(LAMT / 2)*2                                 ALPS0220
221.          IF (LAMT) 415,420,415                                  ALPS0221
222.    415   VN(J)=0.                                               ALPS0222
223.          IFC(J)=IFC(J)-3                                        ALPS0223
224.          GO TO 430                                              ALPS0224
225.    420   CONTINUE                                               ALPS0225
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      425   CONTINUE                                                          ALPS0226
      430   J=J+1                                                             ALPS0227
            IF (NOAT - 1) 445,435,435                                         ALPS0228
      435   DO 440 L=1,NOAT                                                   ALPS0229
            K=IOAT(L)                                                         ALPS0230
            J=-IR(K)                                                          ALPS0231
      440   IFC(J)=IFC(J)+6                                                   ALPS0232
      445   CONTINUE                                                          ALPS0233
      450   RETURN                                                            ALPS0234
      C                                                                       ALPS0235
      455   FORMAT (2A4,F12.5,2A4,E12.4,2A4,F12.5,2A4,F12.5)                  ALPS0236
      460   FORMAT (29H  UPDATE OF DIFFUSION FACTORS/10X,7HSPECIES5X16HDIFFUSIALPS0237
           1ON FACTOR)                                                        ALPS0238
      465   FORMAT (11X2A4,6XF10.3,2A2)                                       ALPS0239
      470   FORMAT (11X2A4,6XF10.5,2A2)                                       ALPS0240
      475   FORMAT (I3,3X,F6.5,F6.4)                                          ALPS0241
      480   FORMAT (/5X54HALL GASEOUS DIFUSSION FACTORS RECALCULATED AS (MOL.WALPS0242
           1T/F7.3,3H)**F6.3//)                                               ALPS0243
      485   FORMAT (//// 5X39HSICK MASS BALANCE INITIATION. CHECK . . /       ALPS0244
           1  10X73H), REARRANGEMENT OF ELEMENTS BETWEEN EDGE AND WALL SOLUTIOALPS0245
           2NS (KR(2).GT.0) /10X28H2. COMPONENT MASS FRACTION ( 3E12.4,11H) MOALPS0246
           3T EQUAL/10X71HTO ZERO FOR UNDEFINED COMPONENT (ALL ZERO GRAM-ATOMIALPS0247
           4C-WEIGHTS PER GRAM) )                                             ALPS0248
      490   FORMAT (////5X75HNO VALID EDGE COMPOSITION AVAILABLE BECAUSE LAST ALPS0249
           1SOLUTION WAS NON CONVERGENT OR/11X73HNEW FIRST GUESSES HAVE BEEN IALPS0250
           2NTRODUCED IN INPUT SUBROUTINE (KR(3)=1 TO 8) )                    ALPS0251
            END                                                               ALPS0252
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      SUBROUTINE RELCH                                                  RELC0001
C                                                                       RELC0002
      REAL NEIA(1),NEIB(1),EEIN(1),TAU(10,10)                           RELC0003
      EQUIVALENCE (NEIA(1),A(1)), (NEIB(1),A(51)), (EEIN(1),A(101)),    RELC0004
     1(TAU(1),A(151))                                                   RELC0005
      DIMENSION TE(180),CIJ(180,1)                                      RELC0006
      DIMENSION X(1),VLAM(180,1)                                        RELC0007
C                                                                       RELC0008
      COMMON          FAMOA(180),FAMOB(180),RR(180,2),RC(180,2),        RELC0009
     1                RO(180,2),PE(180,2),PE(180,2),TU(180,2),VN(180),  RELC0010
     2                Y(180),WTR(180),VNU(180,10),EE(180),IEC(180),     RELC0011
     3                IP(180),CP(180),H(180),SR(180),TC(180),VLNK(180), RELC0012
     4                E(180),LAMT(180),GAMK(1,1)                        RELC0013
C                                                                       RELC0014
      COMMON /PARAM1/ KIN,KOUT,JAN,MOL,MAP,IGC,D,KKX(3),KR(10),TILE(3), RELC0015
     1                TTMIN,TTMAX,VISC,PR(1)                            RELC0016
C                                                                       RELC0017
      COMMON /PARAM2/ WM,SCH,RHO,VEL,B1,NEE,EEA,TS,ISP,P,T,SIP,HIP,     RELC0018
     1                EL,ENL,ELTQ,MQ,IEL,ISPQ,KRALP,CPE,IRE,IER,AA,ITS, RELC0019
     2                IN,IL,IT,MODE,HMELT,SMELT,TMAX,TMIN,MELT,SUMN,    RELC0020
     3                SUML,JC,HG,CPG,SVA,SVB,SVC,SVD,SUMC,NXC,SA1,      RELC0021
     4                VKACH,KRZZ,SP1,GAM,THT,MX,DMCHT,PCH,NCV,TRT,      RELC0022
     5                IERZ,NOAT,SR1,IXG,SV1,KKJ,IXC,NXG,SH1,NOATO,      RELC0023
     6                SA2,EEE,WS,RV,CME,VA,HOS,DUM1,DUM2,EP,IECJC,      RELC0024
     7                ISP2,WTG,VMU2,WTL                                 RELC0025
C                                                                       RELC0026
      COMMON /ARRAYS/ A(16,16),B(16),W(3),XC(50),XG(50),ZKE(10),        RELC0027
     1                TLO(10),DMCLO(10),WALJP(10),ER(10),ALP(10),       RELC0028
     2                GAMH(10),GAME(10),TQ(10,3),TK(10,3),WAT(10),      RELC0029
     3                IP(10),IOAT(10),KAT(10),UM(10,10),ERL(10)         RELC0030
      EQUIVALENCE (TU(181),TE(1)), (VNU(1),CIJ(1))                      RELC0031
C                                                                       RELC0032
      COMMON /KINETX/ MT,EKE(50),EAK(50),EXK(50),PMU(10,50),RMU(10,50), RELC0033
     1                PMP(50),PKKK(50)                                  *COR
C                                                                       RELC0035
      EQUIVALENCE (B(1),X(1)), (GAMK(1),VLAM(1))                        RELC0036
C                                                                       RELC0037
      COMMON /DIFFER/ IC(11),ALPT(10),C(10),SORCE(8),RA(2),IM(10),      RELC0038
     1                II,KK,J,VINT,YINT,JAT(10),LIM(10,10),FAMA(10),    RELC0039
     2                FAMB(10),KPHA(2)                                  RELC0040
C                                                                       RELC0041
      DIMENSION ATA(10),ATB(10),ATC(10)                                 RELC0042
      EQUIVALENCE (TQ(1),ATA(1)), (TQ(11),ATB(1)), (TQ(21),ATC(1))      RELC0043
C                                                                       RELC0044
5     IF (J - IS) 10,10,15                                              RELC0045
10    JM=J-1                                                            RELC0046
      WRITE (KOUT,190) JM,IS,(FAMOA(I),FAMOB(I),I=1,JM)                 RELC0047
      WRITE (KOUT,195) (FAMOA(I),FAMOB(I),I=ISP,N)                      RELC0048
      STOP                                                              RELC0049
15    DO 25 L=2,IS                                                      RELC0050
      JM=ISP-L                                                          RELC0051
      IMJ=IM(JM + 1)                                                    RELC0052
      IF (JM -1) 30,20,20                                               RELC0053
20    DO 25 K=1,JM                                                      RELC0054
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      UGH=TAU(IMJ,K)                                                    BELC0055
      DO 25 I=1,IS                                                      BELC0056
25    UM(I,K)=UM(I,K)-UGH*UM(I,JM + 1)                                  BELC0057
30    CONTINUE                                                          BELC0058
      DO 50 I=1,IS                                                      BELC0059
35    IMI=IM(I)                                                         BELC0060
      IF (IMI - I) 40,50,40                                             BELC0061
40    DO 45 K=1,IS                                                      BELC0062
      V=UM(K,IMI)                                                       BELC0063
      UM(K,IMI)=UM(K,I)                                                 BELC0064
45    UM(K,I)=V                                                         BELC0065
      IM(I)=IM(IMI)                                                     BELC0066
      IM(IMI)=IMI                                                       BELC0067
      GO TO 35                                                          BELC0068
50    CONTINUE                                                          BELC0069
C     -----ELEMENT -- BASE GAS CORRESPONDENCE                           BELC0070
C     INITIALIZE ROW AND COLUMN SUMS                                    BELC0071
      IG=IS                                                             BELC0072
      DO 55 I=1,IS                                                      BELC0073
      IR(I)=-1                                                          BELC0074
55    IC(I)=-1                                                          BELC0075
C     EVALUATE INITIAL SUMS                                             BELC0076
      LAMD=1                                                            BELC0077
      DO 70 I=1,IS                                                      BELC0078
      DO 65 J=1,IS                                                      BELC0079
      LAMT=LAMI(J)/LAMD                                                 BELC0080
      LIM(I,J)=LAMT-(LAMT / 2)*2                                        BELC0081
      IF (LIM(I,J)) 60,65,60                                            BELC0082
60    IC(J)=IC(J)+1                                                     BELC0083
      IR(I)=IR(I)+1                                                     BELC0084
65    CONTINUE                                                          BELC0085
70    LAMD=LAMD+LAMD                                                    BELC0086
C     CHECK FOR ZEROS                                                   BELC0087
75    IZ=0                                                              BELC0088
80    DO 165 I=1,IS                                                     BELC0089
      IF (IC(I) - IZ) 120,85,120                                        BELC0090
85    DO 90 J=1,IS                                                      BELC0091
      IF (LIM(J,I)) 95,90,95                                            BELC0092
90    CONTINUE                                                          BELC0093
95    IC(I)=-J                                                          BELC0094
      IR(J)=-I                                                          BELC0095
      LIM(J,I)=0                                                        BELC0096
      DO 115 K=1,IS                                                     BELC0097
      IF (LIM(J,K)) 100,105,100                                         BELC0098
100   IC(K)=IC(K)-1                                                     BELC0099
      LIM(J,K)=0                                                        BELC0100
105   IF (LIM(K,I)) 110,115,110                                         BELC0101
110   LIM(K,I)=0                                                        BELC0102
      IR(K)=IR(K)-1                                                     BELC0103
115   CONTINUE                                                          BELC0104
      GO TO 170                                                         BELC0105
120   IF (IR(I) - IZ) 165,125,165                                       BELC0106
125   DO 135 J=1,IS                                                     BELC0107
      IF (LIM(I,J)) 130,135,130                                         BELC0108
130   IC(J)=-I                                                          BELC0109
      IR(I)=-J                                                          BELC0110
      LIM(I,J)=0                                                        BELC0111
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      GO TO 140                                                         RELC0112
  135 CONTINUE                                                          RELC0113
  140 DO 160 K=1,IS                                                     RELC0114
      IF (LIM(K,J)) 145,150,145                                         RELC0115
  145 IR(K)=IR(K)-1                                                     RELC0116
      LIM(K,J)=0                                                        RELC0117
  150 IF (LIM(I,K)) 155,160,155                                         RELC0118
  155 LIM(I,K)=0                                                        RELC0119
      IC(K)=IC(K)-1                                                     RELC0120
  160 CONTINUE                                                          RELC0121
      GO TO 170                                                         RELC0122
  165 CONTINUE                                                          RELC0123
      IZ=IZ+1                                                           RELC0124
      GO TO 80                                                          RELC0125
  170 IS=IS-1                                                           RELC0126
      J=IS+1                                                            RELC0127
      IF (IS) 175,175,75                                                RELC0128
  175 DO 180 I=1,IS                                                     RELC0129
      K=IR(I)                                                           RELC0130
      FAMA(I)=FAMOA(K)                                                  RELC0131
  180 FAMB(I)=FAMOB(K)                                                  RELC0132
      WRITE (KOUT,200) (ATA(I),ATB(I),A(C(I)),I=1,IS)                   RELC0133
      WRITE (KOUT,205) (FAMA(I),FAMB(I),I=1,IS)                         RELC0134
      DO 185 L=1,3                                                      RELC0135
      DO 185 I=1,IS                                                     RELC0136
      TS(I,L)=0.                                                        RELC0137
      DO 185 K=1,IS                                                     RELC0138
  185 TS(I,L)=TC(I,L)+UF(I,K)*TK(K,L)                                   RELC0139
      RETURN                                                            RELC0140
C                                                                       RELC0141
  190 FORMAT (////15H ONLY FOLLOWING,I3,23H BASE SPECIES FOUND FOR13,   RELC0142
     1 9H ELEMENTS/(2X20A4))                                            RELC0143
  195 FORMAT (/30H OTHER SPECIES CONSIDERED WERE/(2X20A4))              RELC0144
  200 FORMAT (/5X,8HELEMENTS,7X,15A4/(20X,15A4))                        RELC0145
  205 FORMAT (/5X,12HBASE SPECIES,3X,5(2A4,4X)/(20X,5(2A4,4X)))         RELC0146
      END                                                               RELC0147
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      SUBROUTINE CRECT (NOE)                                            CREC0001
      DIMENSION DY(1),DYA(1)                                            CREC0002
C                                                                       CREC0003
      REAL MFIA(1),MFIB(1),FETN(1),TAU(10,10)                           CREC0004
      EQUIVALENCE (MFIA(1),A(1)), (DFIN(1),A(5)), (FFIN(1),A(101)),     CREC0005
     1(TAU(1),A(151))                                                   CREC0006
      DIMENSION TF(180),CIJ(180,1)                                      CREC0007
      DIMENSION X(1),VLAM(180,1)                                        CREC0008
C                                                                       CREC0009
      COMMON          FAMOA(180),FAMOB(180),RR(180,2),RC(180,2),        CREC0010
     1                RC(180,2),RE(180,2),RF(180,2),TU(180,2),VN(180),  CREC0011
     2                Y(180),NTN(180),VNU(180,10),FF(180),TFC(180),     CREC0012
     3                IR(180),CF(180),H(180),SA(180),TC(180),VLNK(180), CREC0013
     4                E(180),LAMT(180),GAMK(1,1)                        CREC0014
C                                                                       CREC0015
      COMMON /PARAM1/ KIN,KOUT,JAN,MOL,NAB,IPC,N,KKX(3),KR(10),TILE(3), CREC0016
     1                TTMIN,TTMAX,VISC,PR(1)                            CREC0017
C                                                                       CREC0018
      COMMON /PARAM2/ HR,SCH,RHO,VEL,B1,MEE,EEA,IS,ISP,P,T,STE,HTP,     CREC0019
     1                EL,ENL,FLIC,NO,IEL,ISPO,KKALP,CPE,IRE,IER,AA,TTS, CREC0020
     2                IM,IL,IT,MODE,HMELT,SMELT,TMAX,TMIN,MELT,SUMN,    CREC0021
     3                SUML,JC,HG,CPG,SVA,SVB,SVC,SVD,SUMC,NXC,SA1,      CREC0022
     4                VMACH,KPZZ,SP1,GAM,THT,MX,OMCHT,HCH,NCV,IRT,      CREC0023
     5                IENZ,NOAT,SR1,IXG,SV1,KKJ,IXC,NXG,SH1,NOATO,      CREC0024
     6                SA2,EEE,WS,RV,CME,VA,HOS,DUM1,DUM2,FP,IFCJC,      CREC0025
     7                ISP2,WTG,VNU2,WTL                                 CREC0026
C                                                                       CREC0027
      COMMON /ARRAYS/ A(16,16),P(16),W(3),XC(50),XG(50),ZKE(10),        CREC0028
     1                TIG(10),DMCLO(10),WALJP(10),FB(10),ALP(10),       CREC0029
     2                GAMH(10),GAME(10),TQ(10,3),TK(10,3),WAT(10),      CREC0030
     3                IR(10),IOAT(10),KAT(10),UM(10,10),EBL(10)         CREC0031
      EQUIVALENCE (TU(1A1),TF(1)), (VNU(1),CIJ(1))                      CREC0032
C                                                                       CREC0033
      COMMON /KINETX/ MI,FKF(50),FAK(50),FXK(50),PMU(10,50),RMU(10,50), CREC0034
     1                PMR(50),PKKK(50)                                  CREC0035
C                                                                       CREC0036
      EQUIVALENCE (B(1),X(1)), (GAMK(1),VLAM(1))                        CREC0037
C                                                                       CREC0038
      COMMON /DIFFER/ IP(11),FMU(10),PNUS(10),SLAM(10),BF(10),BY(10),   CREC0039
     1                IRC(10),JJ(10),SLB(16),SLA(16,16)                 CREC0040
C                                                                       CREC0041
      EQUIVALENCE(A(1),DY(1),DYA(1))                                    CREC0042
      M1=1                                                              CREC0043
      M=IR(1)                                                           CREC0044
      WTL=0.                                                            CREC0045
      WTG=0.                                                            CREC0046
      DUM2=0.                                                           CREC0047
      T=1                                                               CREC0048
      LIM=KR(6)+M                                                       CREC0049
      DO 130 IK=1,LIM                                                   CREC0050
      DYI=CME*DY(IK)                                                    CREC0051
      IF (DYI) 10,5,10                                                  CREC0052
    5 IF (IFC(I)) 130,50,120                                            CREC0053
   10 IF (IFC(I)) 90,15,115                                             CREC0054
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      15    IF (IP(I)) 20,45,20                                          CREC0055
      20    IF (M - IK) 25,30,25                                         CREC0056
      25    IF (MOF) 45,45,35                                            CREC0057
      30    M1=M1+1                                                      CREC0058
            M=IR(M1)                                                     CREC0059
      35    VN(I)=VN(I)*(1. + DYI)                                       CREC0060
            IF (VN(I)) 45,45,40                                          CREC0061
      40    Y(I)=ALOG(VN(I))                                             CREC0062
            GO TO 50                                                     CREC0063
      45    Y(I)=Y(I)+DYI                                                CREC0064
            VN(I)=EXP(Y(I))                                              CREC0065
      50    VA=WTM(I)*VN(I)                                              CREC0066
            WTG=WTG+VA                                                   CREC0067
            DUM2=DUM2+VA/FF(I)                                           CREC0068
            IF (IK - IS) 55,55,65                                        CREC0069
      55    PNUS(I)=VN(I)                                                CREC0070
            IF (KR(6)) 130,60,60                                         CREC0071
      60    SLAM(I)=VN(I)/FF(I)                                          CREC0072
            GO TO 130                                                    CREC0073
      65    DO 75 K=1,IS                                                 CREC0074
            VA=VNU(I,K)*VN(I)                                            CREC0075
            IF (KR(6)) 75,70,75                                          CREC0076
      70    SLAM(K)=SLAM(K)+VA/FF(I)                                     CREC0077
      75    PNUS(K)=PNUS(K)+VA                                           CREC0078
            IF (KR(6)) 130,130,80                                        CREC0079
      80    DO 85 K=1,IS                                                 CREC0080
      85    SLAM(K)=SLAM(K)+VN(I)*VLAM(I,K)                              CREC0081
      C     NON-PRESENT BASE CORRECTIONS AND TESTS                       CREC0082
      90    Y(I)=Y(I)+DYI                                                CREC0083
            IF (Y(I)) 130,95,95                                          CREC0084
      95    IF (IFC(I) + 1) 130,100,100                                  CREC0085
     100    IF (KR(6)) 110,105,105                                       CREC0086
     105    IF (T - TF(I) + .001) 130,110,110                            CREC0087
     110    Y(I)=0.                                                      CREC0088
            IFC(I)=+1                                                    CREC0089
            GO TO 130                                                    CREC0090
     115    VN(I)=VN(I)+DYI                                              CREC0091
            IF (VN(I)) 125,125,120                                       CREC0092
     120    WTL=WTL+VN(I)*WTM(I)                                         CREC0093
            GO TO 130                                                    CREC0094
     125    VN(I)=0.                                                     CREC0095
            IFC(I)=-1                                                    CREC0096
     130    I=I+1                                                        CREC0097
            IF (KR(6)) 145,135,145                                       CREC0098
     135    FFF=WTG/DUM2                                                 CREC0099
            DO 140 I=1,IS                                                CREC0100
     140    SLAM(I)=SLAM(I)*FFF                                          CREC0101
     145    RETURN                                                       CREC0102
            END                                                          CREC0103
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      C     PROGRAM GASKET(INPUT,OUTPUT,PUNCH,TAPE16,TAPE5=INPUT,TAPE6=OUTPUT)GASK0001
      C                                                                     GASK0002
      C*********************************************************************GASK0003
      C                                                                     GASK0004
      C  GGGGGGGG     AAAAAAAA     SSSSSSSS   KK      KK  EEEEEEEEEE  TTTTTTTTTTGASK0005
      C GGGGGGGGGG   AAAAAAAAAA  SSSSSSSSSS  KK     KK   EEEEEEEEEE  TTTTTTTTTTGASK0006
      C GG          AA      AA  SS          S KK   KK     EE              TT    GASK0007
      C GG          AA      AA  SS            KK KK       EE              TT    GASK0008
      C GG    GGGGG AA      AA  SSSSSSSSS     KKKKK       EEEEEE          TT    GASK0009
      C GG    GGGGG AAAAAAAAAA    SSSSSSSSS   KK  KK      EEEEEE          TT    GASK0010
      C GG       GG AAAAAAAAAA          SS    KK   KK     EE              TT    GASK0011
      C GG       GG AA      AA  S       SS    KK    KK    EE              TT    GASK0012
      C GGGGGGGGGG  AA      AA  SSSSSSSSS   KK     KK   EEEEEEEEEE      TT    GASK0013
      C  GGGGGGGG   AA      AA   SSSSSSS    KK      KK  EEEEEEEEEE      TT    GASK0014
      C                                                                     GASK0015
      C*********************************************************************GASK0016
      C                                                                     GASK0017
      C     MAINLINE ROUTINE FOR GASKET PROGRAM . . . .NOVEMBER 1971        GASK0018
            REAL MEIA(1),MFIB(1),EETM(1),TAU(10,10)                         GASK0019
            EQUIVALENCE (MFIA(1),A(1)), (MEIB(1),A(51)), (EEIP(1),A(101)),  GASK0020
           1(TAU(1),A(151))                                                 GASK0021
            DIMENSION TF(180),CIJ(180,1)                                    GASK0022
            DIMENSION X(1),VLAM(180,1)                                      GASK0023
      C                                                                     GASK0024
            COMMON          FAMDA(180),FAMDS(180),PF(180,2),RC(180,2),      GASK0025
           1                PP(180,2),PE(180,2),PF(180,2),TU(180,2),VN(180),GASK0026
           2                Y(180),RTM(180),VMU(180,10),FF(180),IFC(180),   GASK0027
           3                JP(180),CP(180),H(180),SH(180),TC(180),VLNK(180),GASK0028
           4                F(180),LAM(180),GAMK(1,1)                       GASK0029
      C                                                                     GASK0030
            COMMON /PARAM1/ KIN,KOUT,JAN,MOL,NAE,IDC,N,KKX(3),KP(10),TITLE(3),GASK0031
           1                TTMIN,TTMAX,VISC,PR(1)                          GASK0032
      C                                                                     GASK0033
            COMMON /PARAM2/ VA,SCH,PHO,VEL,M1,NFE,FFA,TS,ISP,P,T,SIP,HIP,   GASK0034
           1                FL,FNL,FLIG,NG,IFL,ISPG,KRALP,CPE,IRE,IFR,AA,TTS,GASK0035
           2                IN,IL,IT,NODE,HMELT,SMELT,TMAX,TMIN,MELT,SUMN,  GASK0036
           3                SUML,JC,HG,CPG,SVA,SVB,SVC,SVD,SUMC,NXC,SA1,    GASK0037
           4                VABCH,KRZ,SP1,GAM,TMT,MX,GMCMT,HCH,NCV,TRT,     GASK0038
           5                IFRZ,TOAT,SR1,IXC,SV1,KKJ,TXC,NXG,SH1,TOATO,    GASK0039
           6                SA2,FFF,HS,RV,CPF,VA,HOS,DUM1,DUM2,FP,IFCJC,    GASK0040
           7                ISP2,UTG,VMU2,MTL                               GASK0041
      C                                                                     GASK0042
            COMMON /ARRAYS/ A(16,16),H(16),W(3),XC(50),XC(50),ZKE(10),      GASK0043
           1                TLC(10),DMCLD(10),VALJP(10),EE(10),AL2(10),     GASK0044
           2                GAMH(10),GAME(10),TC(10,4),IK(10,4),WAT(10),    GASK0045
           3                IP(10),TOAT(10),KAT(10),HE(10,10),FBL(10)       GASK0046
            EQUIVALENCE (IJ(1),IF(1)), (VMU(1),CIJ(1))                      GASK0047
      C                                                                     GASK0048
            COMMON /KINETX/ M1,FKF(50),FAK(50),FXK(50),PMU(10,50),PKU(10,50),GASK0049
           1                PX2(50),PKKK(50)                                *COR
      C                                                                     GASK0051 **-1
            EQUIVALENCE (H(1),X(1)), (GAMK(1),VLAM(1))                      GASK0052
      C                                                                     GASK0053
            COMMON /DIFFF/ IF(11),FNU(10),PHOS(10),SLAM(10),BE(10),BY(10),  GASK0054
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      1                 IC(10),JJ(10),SLB(16),SLA(16,16)                  GASK0055
      2                 ,DUMMY(8)                                         GASK0056
C                                                                         GASK0057
      COMMON/CASKIN/ KR(10),ROUGH,NCC                                     GASK0058
C     I/O SPECIFICATIONS ALSO IN RERAY                                    GASK0059
      KIN=5                                                               GASK0060
      KOUT=6                                                              GASK0061
      JAN=18                                                              GASK0062
      NCC=0                                                               GASK0063
      REWIND  JAN                                                         GASK0064
      ITS=0                                                               GASK0065
5     CALL  ZIPIN                                                         GASK0066
      IF (KR(2) + KR(3)) 10,10,15                                         GASK0067
10    IF (KRALP) 40,40,35                                                 GASK0068
15    TI=0                                                                GASK0069
      IF (KR(2)) 25,25,20                                                 GASK0070
20    CALL  IMELM                                                         GASK0071
      IF (KR(3)) 35,35,25                                                 GASK0072
25    IF (KR(3) - 9) 30,35,35                                             GASK0073
30    CALL  INPUT                                                         GASK0074
      CALL  BELCH                                                         GASK0075
      CALL  INPUT                                                         GASK0076
      REWIND  JAN                                                         GASK0077
35    CALL  ALPST                                                         GASK0078
40    IF (KR(7) - 1) 85,85,80                                             GASK0079
45    IF (KKJ) 50,55,55                                                   GASK0080
50    KKJ=-3                                                              GASK0081
      GO TO 60                                                            GASK0082
55    IF (KR(1)-2) 60,65,65                                               GASK0083
60    MODE=2                                                              GASK0084
      JJC=JC                                                              GASK0085
      IIT=IT                                                              GASK0086
      CALL  MAT1                                                          GASK0087
      CALL  MAT2                                                          GASK0088
      CALL  MAT3                                                          GASK0089
      JC=JJC                                                              GASK0090
      IT=IIT                                                              GASK0091
65    IF (KR(6)) 75,70,70                                                 GASK0092
70    ISPG=ISP2                                                           GASK0093
75    MODE=KR(1)                                                          GASK0094
      CALL RERAY (ISPG,A,0,B,0,0,IG)                                      GASK0095
      CALL  PROPS                                                         GASK0096
      KR(7)=MIN0(1,KR(7))                                                 GASK0097
      IQI=0                                                               GASK0098
      IF (KKJ) 80,80,40                                                   GASK0099
80    CALL  OUTPT                                                         GASK0100
C     PRINCIPAL ITERATIVE LOOP                                            GASK0101
85    IF (ITS) 5,95,90                                                    GASK0102
90    IF (MODE) 100,100,95                                                GASK0103
95    CALL  THERM                                                         GASK0104
      IF (IERZ) 100,100,150                                               GASK0105
100   MODE=KR(1)                                                          GASK0106
      FLIQ=0.                                                             GASK0107
      CALL  MAT1                                                          GASK0108
      CALL  MAT2                                                          GASK0109
      CALL  MAT3                                                          GASK0110
      ITS=ITS+1                                                           GASK0111
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      B1=B(1)                                                          GASK0112
      IF (KR(9)) 110,110,105                                           GASK0113
  105 CALL  KINET                                                      GASK0114
  110 MOF=1                                                            GASK0115
      IF (KR(7) - 1) 125,120,115                                       GASK0116
  115 IQQ=-2                                                           GASK0117
      WRITE (KOUT,215) (I,I=1,IS)                                      GASK0118
  120 WRITE (KOUT,210) ITS,T,AA,FL,FNL,CMF,(E(I),I=1,IS)               GASK0119
  125 IF (ITS) 45,A0,130                                               GASK0120
  130 IT=ITS                                                           GASK0121
      IF (ITS-67) 140,135,140                                          GASK0122
  135 KR(7)=9                                                          GASK0123
      IQQ=-2                                                           GASK0124
  140 IF (ITS-70) 155,155,145                                          GASK0125
  145 NCV=1                                                            GASK0126
      KR(7)=4                                                          GASK0127
      IG=-2                                                            GASK0128
      ITS=-1                                                           GASK0129
      GO TO 45                                                         GASK0130
  155 CALL SWAP (SLA,SLB,A,B)                                          GASK0131
      ICT=10                                                           GASK0132
      DUM1=0.                                                          GASK0133
      IQI=IQQ                                                          GASK0134
  160 DO 170 I=1,IS                                                    GASK0135
      IF (IFC(I) - 1) 170,170,165                                      GASK0136
  165 A(I + 2,I + 2)=1.E+10                                            GASK0137
  170 CONTINUE                                                         GASK0138
      IQQ=IQI                                                          GASK0139
      CALL PERAY (IR,A(IL,IL) ,0,B(IL) ,1,0,IQQ)                       GASK0140
      ICT=ICT-1                                                        GASK0141
      IF (ICT) 190,175,175                                             GASK0142
  175 IF (IQQ) 190,180,180                                             GASK0143
  180 CALL  AERAT                                                      GASK0144
      GO TO (160,45,145,185), NO                                       GASK0145
  185 CALL SCALE (MOF)                                                 GASK0146
      CALL CRECT (MOF)                                                 GASK0147
      IF (CMF - 1.E - 12) 190,190,205                                  GASK0148
  190 IF (NCV) 195,200,195                                             GASK0149
  195 CALL SWAP (A,B,SLA,SLB)                                          GASK0150
      GO TO 145                                                        GASK0151
  200 NCV=1                                                            GASK0152
      GO TO 95                                                         GASK0153
  205 IF (KR(7) - 1) 85,45,80                                          GASK0154
C                                                                      GASK0155
  210 FORMAT (/61X,I3,F6.2,1P4E10.2/(1P10E12.5))                       GASK0156
  215 FORMAT (1H1,40X,49HITS TEMP   PRESSURE  EQUIL FR  MASS FR  SCALEGASK0157
     1    /(10(15,7H MASS)))                                          GASK0158
      END                                                              GASK0159
```

```
      SUBROUTINE MAT1                                                    MAT10001
C                                                                        MAT10002
      REAL BETA(1),BETB(1),BETN(1),TAU(10,10)                            MAT10003
      EQUIVALENCE (BETA(1),A(1)), (BETB(1),A(51)), (BETN(1),A(101)),     MAT10004
     1(TAU(1),A(151))                                                    MAT10005
      DIMENSION TF(180),CIJ(180,1)                                       MAT10006
      DIMENSION X(1),VLAM(180,1)                                         MAT10007
C                                                                        MAT10008
      COMMON /PARAM0/ FAMOA(180),FAMOB(180),RB(180,2),RC(180,2),         MAT10009
     1                RD(180,2),RE(180,2),RF(180,2),TU(180,2),VN(180),   MAT10010
     2                Y(180),WTM(180),VNU(180,10),FF(180),IFC(180),      MAT10011
     3                IP(180),CP(180),M(180),SB(180),TC(180),VLNK(180),  MAT10012
     4                E(180),LAMT(180),GAMK(1,1)                         MAT10013
C                                                                        MAT10014
      COMMON /PARAM1/ KIN,KOUT,JAN,MOL,NAF,IDC,N,KKX(3),KR(10),TITLE(3), MAT10015
     1                TTMIN,TTMAX,VISC,PR(1)                             MAT10016
C                                                                        MAT10017
      COMMON /PARAM2/ WK,SCH,RHO,VEL,B1,NFF,FFA,IS,ISP,P,T,SIP,HIP,      MAT10018
     1                EL,ENL,FLIQ,MQ,IFL,ISPQ,KKALP,CPF,IRE,IER,AA,ITS,  MAT10019
     2                IN,IL,IT,MODE,HMELT,SMELT,TMAX,TMIN,MELT,SUMN,     MAT10020
     3                SUML,JC,MG,CPG,SVA,SVB,SVC,SVD,SUMC,NXC,SA1,       MAT10021
     4                VMACH,KRZZ,SP1,GAM,THI,MX,DMCHI,HCH,NCV,TBT,       MAT10022
     5                IFRZ,NOAT,SR1,IXG,SV1,KKJ,IXC,NXG,SH1,NOATC,       MAT10023
     6                SA2,FFF,WS,RV,CMF,VA,HDS,DUM1,DUM2,EP,IFCJC,       MAT10024
     7                ISP2,WTG,VMU2,WTL                                  MAT10025
C                                                                        MAT10026
      COMMON /ARRAYS/ A(16,16),B(16),W(3),XC(50),XG(50),ZKE(10),         MAT10027
     1                TLC(10),DMCLC(10),WALJP(10),EB(10),ALP(10),        MAT10028
     2                GAMH(10),GAMF(10),TQ(10,3),TK(10,3),WAT(10),       MAT10029
     3                IR(10),IOAT(10),KAT(10),UM(10,10),EBL(10)          MAT10030
      EQUIVALENCE (TU(181),TF(1)), (VNU(1),CIJ(1))                       MAT10031
C                                                                        MAT10032
      COMMON /KINETX/ MT,FKF(50),FAK(50),FXK(50),PMU(10,50),RMU(10,50),  MAT10033
     1                PMR(50),PKKK(50)                                   *COR
C                                                                        MAT10035 **-1
      EQUIVALENCE (B(1),X(1)), (GAMK(1),VLAM(1))                         MAT10036
C                                                                        MAT10037
      COMMON /DIFFER/ IB(11),FNU(10),PNUS(10),SLAM(10),BE(10),BY(10),    MAT10038
     1                IBC(10),JJ(10),SLB(16),SLA(16,16)                  MAT10039
C                                                                        MAT10040
      WSS=WS                                                             MAT10041
      DO 5 I=1,IS                                                        MAT10042
    5 IBC(I)=IFC(I)                                                      MAT10043
      IF (KR(6)) 40,15,10                                                MAT10044
   10 WSS=AMIN1(W(1),0.)+AMIN1(W(2),0.)+AMIN1(W(3),0.)                   MAT10045
      WS=W(1)+W(2)+W(3)                                                  MAT10046
      GO TO 20                                                           MAT10047
   15 CONTINUE                                                           MAT10048
   20 IF (ITS) 25,40,40                                                  MAT10049
   25 DO 35 I=1,IS                                                       MAT10050
      IF (IBC(I)-1) 35,30,35                                             MAT10051
   30 IBC(I)=-1                                                          MAT10052
   35 CONTINUE                                                           MAT10053
   40 RV=WSS-WTL/WTG                                                     MAT10054
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      IF (KR(7) - 1) 60,45,50                                                  MAT10055
45    IF (ITS) 60,55,60                                                        MAT10056
50    WRITE (KOUT,325) FFF,WTL,WTG,AA,RV,ALP,PNUS,SLAM                         MAT10057
      KR(7)=KR(7)-1                                                            MAT10058
      IF (KR(7) - 1) 60,55,60                                                  MAT10059
55    WRITE (KOUT,330) (I,I=1,IS)                                              MAT10060
C     INITIALIZE                                                               MAT10061
60    EL=0.                                                                    MAT10062
      CPG=0.                                                                   MAT10063
      EP=P                                                                     MAT10064
      CPF=0.                                                                   MAT10065
      JC=0                                                                     MAT10066
      JCS=0                                                                    MAT10067
      ISPQ=IS+2                                                                MAT10068
      B(1)=0.                                                                  MAT10069
      B(2)=0.                                                                  MAT10070
      A(1,1)=0.                                                                MAT10071
      A(1,2)=0.                                                                MAT10072
      A(2,1)=0.                                                                MAT10073
      A(2,2)=0.                                                                MAT10074
C     -----INITIALIZE CONTRIBUTION OF MOST SIGNIFICANT SPECIES IN EACH         MAT10075
      DO 65 I=1,IS                                                             MAT10076
      EB(I)=0.                                                                 MAT10077
65    E(I)=AA*ALP(I)                                                           MAT10078
      ISP2=ISPQ                                                                MAT10079
C     - - - MAIN BASE SPECIES LOOP                                             MAT10080
      DO 315 IK=1,IS                                                           MAT10081
      I=2-IR(IK)                                                               MAT10082
      IF (KAT(IK)-99) 75,70,75                                                 MAT10083
70    PNUS(I-2)=0.                                                             MAT10084
C     ZERO A MATRIX                                                            MAT10085
75    DO 80 K=1,ISPQ                                                           MAT10086
80    A(K,I)=0.                                                                MAT10087
      IF (ITS) 100,85,100                                                      MAT10088
C     NORMALIZE ON PRESSURE ON FIRST PASS                                      MAT10089
85    VN(I - 2)=VN(I - 2)/SUMN                                                 MAT10090
      EPL(I - 2)=0.                                                            MAT10091
      IF (IBC(I-2)) 100,90,95                                                  MAT10092
90    Y(I - 2)=Y(I - 2)-SUML                                                   MAT10093
      GO TO 100                                                                MAT10094
95    IF (SUMC .NE. 0.0) VN(I-2)=VN(I-2)/SUMC                                  *COR
      IF (SUMC .EQ. 0.0) VN(I-2)=0.0                                           *COR
C     INITIALIZE SOME MORE                                                     MAT10096
100   B(I)=0.                                                                  *+-1
      A(I,1)=0.                                                                MAT10097
      IP(I - 2)=0.                                                             MAT10098
C     SET FLAG INDICATING SIGNIFICANCE OF SPECIES IN MASS                      MAT10099
C     BALANCE(S) AND INCREMENT COUNT ON SIGNIFICANT SPECIES                    MAT10100
      IF (VN(I - 2) - EPL(I - 2)) 110,110,105                                  MAT10101
105   IP(I - 2)=-1                                                             MAT10102
C     TREAT BASE SPECIES CONTAINING BUT NOT REPRESENTING NON-PRESENT           MAT10103
C     ELEMENTS IN SAME MANNER AS NON-PRESENT CONDENSED SPECIES                 MAT10104
110   IF (IBC(I-2)+1) 315,115,115                                              MAT10105
115   IF (IBC(I-2)) 170,205,120                                                MAT10106
120   A(I,I)=1.                                                                MAT10107
      VA=VN(I - 2)                                                             MAT10108
      IF (IABS(IBC(I-2)-3)-1) 125,270,130                                      MAT10109
                                                                               MAT10110
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      125   A(2,I)=1.0                                                        MAT10111
            GO TO 270                                                         MAT10112
      130   IF (ER(I - 2) - ABS(VA)) 135,140,140                              MAT10113
      135   ER(I - 2)=ABS(VA)                                                 MAT10114
            TH(I - 2)=I-2                                                     MAT10115
      140   F(I - 2)=F(I - 2)-VA                                              MAT10116
            IF (KR(6)) 145,150,150                                            MAT10117
      145   IF (MODE - 1) 270,160,270                                         MAT10118
      150   DO 155 K=1,IS                                                     MAT10119
      155   A(K+2,I)=-WTM(I-2)*(PNUS(K)/WTG+GAMF(K))                          MAT10120
            A(I,I)=A(I,I)+1.                                                  MAT10121
      160   TMIN=AMAX1(TMIN,TF(I - 2))                                        MAT10122
            IF (T - TF(I - 2) + .001) 165,165,170                             MAT10123
      165   A(I,I)=1.0E+10                                                    MAT10124
            F(I - 2)=-VN(I - 2)*1.001E+10                                     MAT10125
            MODE=0                                                            MAT10126
      170   IF (MODE-1) 175,160,175                                           MAT10127
      175   IF (KR(8)) 270,270,180                                            MAT10128
      180   IF (TF(I - 2) + .001 - T) 315,185,185                             MAT10129
      185   IF (JC) 195,195,190                                               MAT10130
      190   IF (Y(I-2)-RJC) 315,315,195                                       MAT10131
      195   RJC=Y(I-2)                                                        MAT10132
            JCS=JC                                                            MAT10133
            TMAX=TF(I - 2)                                                    MAT10134
            JC=I-2                                                            MAT10135
            TFCJC=TFC(I-2)                                                    MAT10136
            IF (KR(8)) 200,200,270                                            MAT10137
      200   A(1,JCS+2)=0.                                                     MAT10138
            A(1,I)=-1.0                                                       MAT10139
            B(1)=RJC                                                          MAT10140
            GO TO 315                                                         MAT10141
C           -----GAS PHASE                                                    MAT10142
      205   VA=VN(I - 2)                                                      MAT10143
            CPG=CPG+VA*CP() - 2)                                              MAT10144
            A(I,1)=VA                                                         MAT10145
            A(2,I)=VA                                                         MAT10146
            EP=EP-VA                                                          MAT10147
            IF (KAT(IK)-99) 210,265,210                                       MAT10148
      210   IF (KR(6)) 265,240,215                                            MAT10149
      215   DO 220 K=1,IS                                                     MAT10150
      220   A(K+2,I)=(GAMF(I-2,K) + GAMF(K) * B(I-2))*VA                      MAT10151
            A(I,I)=A(I,I)+VA*RV                                               MAT10152
            DUM2=WTM(I - 2)/WTG*WTL/WTG*VA                                    MAT10153
            DO 235 K=1,IS                                                     MAT10154
            IF (ER(K) - ABS(A(K + 2,I))) 225,230,230                          MAT10155
      225   ER(K)=ABS(A(K + 2,I))                                             MAT10156
            TH(K)=I-2                                                         MAT10157
      230   F(K)=F(K)-A(K + 2,I)                                              MAT10158
      235   A(K + 2,I)=A(K + 2,I)+DUM2*PNUS(K)                                MAT10159
            GO TO 270                                                         MAT10160
      240   DUM1=WTM(I - 2)/WTG*VA                                            MAT10161
            DUM2=WTL/WTG*DUM1                                                 MAT10162
            IF (KR(4)) 245,245,250                                            MAT10163
      245   DUM1=0.                                                           MAT10164
            VA=(RV + 1.)*VA                                                   MAT10165
            GO TO 255                                                         MAT10166
      250   DUM1=DUM1*(1. - EPP / EP(I - 2))                                  MAT10167
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      VA=(RV + FFF / FF(I - 2))*VA                                      MAT10168
255   DO 260 K=1,IS                                                     MAT10169
260   A(K + 2,1)=DUM1*SLAM(K)+DUM2*PNUS(K)                              MAT10170
      A(I,I)=A(I,I)+VA                                                  MAT10171
265   FF(I - 2)=ABS(VA)                                                 MAT10172
      IF(I - 2)=I-2                                                     MAT10173
      F(I - 2)=F(I - 2)-VA                                              MAT10174
270   IF (NODE - 2) 310,290,275                                         MAT10175
275   IF (IRC(I-2)) 315,285,280                                         MAT10176
280   HOS=SF(I - 2)                                                     MAT10177
      GO TO 295                                                         MAT10178
285   HOS=SR(I - 2)-1.9869*Y(I - 2)-1.9869                              MAT10179
      GO TO 300                                                         MAT10180
290   HOS=H(I - 2)                                                      MAT10181
      IF (IRC(I-2)) 315,300,295                                         MAT10182
295   A(1,I)=HOS                                                        MAT10183
      GO TO 305                                                         MAT10184
300   A(1,I)=HOS*VN(I - 2)                                              MAT10185
305   A(1,2)=A(1,2)-HOS*VN(I - 2)                                       MAT10186
310   CPF=CPF+CP(I - 2)*VN(I - 2)                                       MAT10187
315   CONTINUE                                                          MAT10188
      DO 320 I=1,IS                                                     MAT10189
      RE(I)=F(I)                                                        MAT10190
320   RY(I)=Y(I)                                                        MAT10191
      RETURN                                                            MAT10192
C                                                                       MAT10193
325   FORMAT (32H FFF,WTI,WTG,AA,RV/ALP/PNUS/SLAM/1X5E12.5/(1X10E12.5)) MAT10194
330   FORMAT (1H1,40X,49HITS TEMP   PRES*MVT  EQUIL ER  MASBAL ER  SCALEMAT10195
     1    /(10(I5,7H MASBAL)))                                         MAT10196
      END                                                               MAT10197
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      SUBROUTINE MAT2                                                   MAT20001
C                                                                       MAT20002
      REAL MFIA(1),MFIB(1),FFIM(1),TAU(180,10)                          MAT20003
      EQUIVALENCE (MFIA(1),A(1)), (MFIB(1),A(51)), (FFIM(1),A(101)),    MAT20004
     1(TAU(1),A(151))                                                   MAT20005
      DIMENSION TF(180),CIJ(180,1)                                      MAT20006
      DIMENSION X(1),VLAM(180,1)                                        MAT20007
C                                                                       MAT20008
      COMMON           FAMOA(180),FAMOB(180),RR(180,2),RF(180,2),       MAT20009
     1                 RO(180,2),RE(180,2),RF(180,2),TU(180,2),VN(180), MAT20010
     2                 Y(180),WTM(180),VNU(180,10),FF(180),IFC(180),    MAT20011
     3                 IP(180),CP(180),H(180),SB(180),TC(180),VLNK(180), MAT20012
     4                 F(180),LAMI(180),GAMK(1,1)                       MAT20013
C                                                                       MAT20014
      COMMON /PARAM1/ KIN,KOUT,JAN,MOL,NAB,IDC,N,KKX(3),KR(10),TILE(3), MAT20015
     1                TTMIN,TTMAX,VISC,PR(1)                           MAT20016
C                                                                       MAT20017
      COMMON /PARAM2/ WM,SCH,RHO,VEL,B1,NFF,FFA,IS,ISP,P,T,SIP,HIP,     MAT20018
     1                EL,ENL,FLIQ,NQ,IFL,ISPQ,KRALP,CPF,IRE,IER,AA,ITS, MAT20019
     2                IN,IL,IT,MODE,HMELT,SMELT,TMAX,TMIN,MELT,SUMN,   MAT20020
     3                SUML,JC,HG,CPG,SVA,SVB,SVC,SVD,SUMC,NXC,SA1,     MAT20021
     4                VMACH,KRZZ,SP1,GAM,THI,MX,DMCHT,HCH,NCV,TBT,     MAT20022
     5                IRRZ,NOAT,SR1,IXG,SV1,KKJ,IXC,NXG,SH1,NOATO,     MAT20023
     6                SA2,FFF,WS,RV,CMF,VA,HOS,DUM1,DUM2,EP,IFCJC,     MAT20024
     7                ISP2,WTG,VML2,WTL                                MAT20025
C                                                                       MAT20026
      COMMON /ARRAYS/ A(16,16),B(16),W(3),XC(50),XG(50),ZKF(10),        MAT20027
     1                TLQ(10),DMCLO(10),WALJP(10),EB(10),ALP(10),      MAT20028
     2                GAMM(10),GAMF(10),TQ(10,3),TK(10,3),WAT(10),     MAT20029
     3                IR(10),IOAT(10),KAT(10),UM(10,10),EBL(10)        MAT20030
      EQUIVALENCE (TU(181),TF(1)), (VNU(1),CIJ(1))                      MAT20031
C                                                                       MAT20032
      COMMON /KINETX/ MT,FKF(50),EAK(50),FXK(50),PMU(10,50),RMU(10,50), MAT20033
     1                PMR(50),PKKK(50)                                 *COR
C                                                                       MAT20035 **-1
      EQUIVALENCE (B(1),X(1)), (GAMK(1),VLAM(1))                        MAT20036
C                                                                       MAT20037
      COMMON /DIFFER/ IP(11),ENU(10),PNUS(10),SLAM(10),BE(10),BY(10),   MAT20038
     1                IC(10),JJ(10),SLB(16),SLA(16,16)                 MAT20039
C                                                                       MAT20040
      ISPG=IS+2                                                         MAT20041
      ISP2=ISPQ                                                         MAT20042
      IER=0                                                             MAT20043
      IRE=0                                                             MAT20044
      EER=0.                                                            MAT20045
C     - - - MAIN NON-BASE SPECIES LOOP                                  MAT20046
      IF (JC) 10,10,5                                                   MAT20047
    5 BJC=Y(JC)                                                         MAT20048
   10 LIM=N+KR(P)                                                       MAT20049
      IF (LIM-ISP) 390,15,15                                            MAT20050
   15 J=ISP                                                             MAT20051
      DO 385 IK=ISP,LIM                                                 MAT20052
      IF (IK-N) 25,25,20                                                MAT20053
   20 F(J)=1.E-10                                                       MAT20054
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      IF (IFC(J)) 70,385,105                                          MAT20055
25    IF (IFC(J)+1) 385,30,30                                         MAT20056
30    IF (ITS) 50,35,50                                               MAT20057
35    VN(J)=VN(J)/SUMN                                                MAT20058
      IF (IFC(J)) 50,45,40                                            MAT20059
40    IF (SUMC .NE. 0.0) VN(J)=VN(J)/SUMC                                        *COR
      IF (SUMC .EQ. 0.0) VN(J)=0.0                                               *COR
      GO TO 50                                                        MAT20061   **-1
45    Y(J)=Y(J)-SUML                                                  MAT20062
50    E(J)=YLMK(J)-Y(J)                                               MAT20063
      DO 65 I=1,IS                                                    MAT20064
      IF (IBC(I)) 60,60,55                                            MAT20065
55    ENU(I)=0.                                                       MAT20066
      GO TO 65                                                        MAT20067
60    ENU(I)=VNU(J,I)                                                 MAT20068
      E(J)=E(J)+ENU(I)*BY(I)                                          MAT20069
65    CONTINUE                                                        MAT20070
      EAB=ABS(E(J))                                                   MAT20071
      IF (IFC(J)) 70,250,105                                          MAT20072
C     CONDENSED SPECIES                                               MAT20073
70    EAB=E(J)                                                        MAT20074
      IF (KR(6)) 85,75,75                                             MAT20075
75    IF (1-TF(J)+.001) 80,85,85                                      MAT20076
80    EAB=0.                                                          MAT20077
      IF (KR(6)) 195,195,205                                          MAT20078
85    IF (E(J) - EER) 195,195,90                                      MAT20079
90    EER=E(J)                                                        MAT20080
      IF (ISP) 95,95,100                                              MAT20081
95    ISPO=ISPO+1                                                     MAT20082
      IER=ISPO                                                        MAT20083
100   IE=IER                                                          MAT20084
      IRE=IK                                                          MAT20085
      GO TO 110                                                       MAT20086
105   ISPO=ISPO+1                                                     MAT20087
      IE=ISPO                                                         MAT20088
110   WTR=0.                                                          MAT20089
      IF (KR(6)) 120,115,115                                          MAT20090
115   TMIN=AMAX1(TF(J) ,TMIN)                                         MAT20091
      WTR=WTX(J)/WTG                                                  MAT20092
120   DO 125 I=1,ISPO                                                 MAT20093
      A(I,IE)=0.                                                      MAT20094
125   A(IE,I)=0.                                                      MAT20095
      DO 140 K=1,IS                                                   MAT20096
      DUM1=VNU(J,K)                                                   MAT20097
      IF (IBC(K)-1) 130,130,140                                       MAT20098
130   VA=DUM1*VN(J)                                                   MAT20099
      A(K+2,IE)=DUM1-WTR*(PNUS(K) +GAMF(K)*WTG)                       MAT20100
      BE(K)=BE(K)-VA                                                  MAT20101
      IF (ABS(VA) - EB(K)) 140,140,135                                MAT20102
135   EB(K)=ABS(VA)                                                   MAT20103
      IB(K)=IK                                                        MAT20104
140   CONTINUE                                                        MAT20105
      K=IE-ISP2                                                       MAT20106
      IF (IK-1) 165,165,145                                           MAT20107
145   JJ(K)=JC                                                        MAT20108
      B(IE)=Y(JC)                                                     MAT20109
      IF (JC-IS) 155,155,150                                          MAT20110
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      150   A(IE,1)=TC(JC)                                                  MAT20111
            B(IE)=F(JC)                                                     MAT20112
      155   EAR=-B(IE)                                                      MAT20113
            IF (IECJC) 375,475,160                                          MAT20114
      160   EAR=ABS(EAR)                                                    MAT20115
            GO TO 475                                                       MAT20116
      165   JJ(K)=J                                                         MAT20117
            A(IE,1)=TC(J)                                                   MAT20118
            B(IE)=F(J)                                                      MAT20119
            IF (T+.001-TF(J)) 175,170,170                                   MAT20120
      170   IF (KR(6)) 190,190,200                                          MAT20121
      175   IF (MODE - 1) 180,185,180                                       MAT20122
      180   IF (KR(6)) 190,185,185                                          MAT20123
      185   A(IE,IE)=1.E+10                                                 MAT20124
            B(IE)=-VN(J)*1.0E+10                                            MAT20125
            MODE=0                                                          MAT20126
      190   IF (MODE - 2) 195,235,240                                       MAT20127
      195   IF (MODE - 1) 375,200,375                                       MAT20128
      200   IF (T-TF(J)-.001) 205,205,220                                   MAT20129
      205   IF (JC) 215,215,210                                             MAT20130
      210   IF (E(J)-EJC) 365,365,215                                       MAT20131
      215   EJC=E(J)                                                        MAT20132
            JC=IE                                                           MAT20133
            IECJC=IEC(JC)                                                   MAT20134
            TMAX=TF(J)                                                      MAT20135
            IF (KR(6)) 225,225,220                                          MAT20136
      220   IF (MODE-2) 365,235,240                                         MAT20137
      225   B(I)=EJC                                                        MAT20138
            DO 230 K=1,IS                                                   MAT20139
      230   A(I,K + 2)=-EJC(K)                                              MAT20140
            A(I,1)=TC(J)                                                    MAT20141
            GO TO 365                                                       MAT20142
      235   HOS=H(J)                                                        MAT20143
            GO TO 245                                                       MAT20144
      240   HOS=SP(J)                                                       MAT20145
      245   A(I,IE)=HOS                                                     MAT20146
            A(I,2)=A(I,2)-VN(J)*HOS                                         MAT20147
            CPE=CPE+CP(J)*VN(J)                                             MAT20148
            GO TO 375                                                       MAT20149
      C     GAS PHASE SPECIES                                               MAT20150
      250   TF(J)=0                                                         MAT20151
            IF (VN(J)) 255,375,255                                          MAT20152
      255   TG=0                                                            MAT20153
            CPG=CPG+VN(J)*CP(J)                                             MAT20154
            IF (KR(6)) 285,260,265                                          MAT20155
      260   FFJ=FFG/FF(J)                                                   MAT20156
      265   DUM1=PP(J)/VTG+VN(J)                                            MAT20157
            DUM2=DUM1/VTG*PT                                                MAT20158
            IF (KR(6)) 270,270,285                                          MAT20159
      270   IF (KR(4)) 275,275,280                                          MAT20160
      275   DUM1=0.                                                         MAT20161
            FFJ=1.0                                                         MAT20162
            GO TO 285                                                       MAT20163
      280   DUM1=DUM1*(1. - FFJ)                                            MAT20164
      285   DO 340 KI=1,IS                                                  MAT20165
            I=2-IR(KI)                                                      MAT20166
            VA=VN(J+1 - 2)*VF(J)                                            MAT20167
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      IF (KAT(KT)-99) 290,305,290                                       MAT20168
290   IF (KB(E)) 305,300,295                                            MAT20169
295   VA=VA*RV+VN(J)*(VLAB(J,I - 2) + GAIP(I - 2) * H(J))               MAT20170
      BE(I - 2)=BE(I - 2)-VA                                            MAT20171
      ABSVA=ABS(VA)                                                     MAT20172
      VA=VA+PHUS(I - 2)*DUM2                                            MAT20173
      GO TO 310                                                         MAT20174
300   VE=VA*EEJ                                                         MAT20175
      VA=RV*VA+VB                                                       MAT20176
      BE(I - 2)=BE(I - 2)-VA                                            MAT20177
      ABSVA=ABS(VA)                                                     MAT20178
      VA=VA+SLAB(I - 2)*DUM1+DUM2*PHUS(I - 2)                           MAT20179
      GO TO 310                                                         MAT20180
305   BE(I - 2)=BE(I - 2)-VA                                            MAT20181
      ABSVA=ABS(VA)                                                     MAT20182
310   IF (ABSVA - EBL(I - 2)) 320,320,315                               MAT20183
315   IW=1                                                              MAT20184
      IF (ABSVA - EB(I - 2)) 330,330,325                                MAT20185
320   IF (ABS(VA) - EPL(I - 2)) 340,340,330                             MAT20186
325   EP(I - 2)=ABSVA                                                   MAT20187
      IS(I - 2)=IK                                                      MAT20188
330   DO 335 K=3,ISP2                                                   MAT20189
335   A(I,K)=A(I,K)+VA*ENU(K - 2)                                       MAT20190
      B(I)=B(I)-VA*E(J)                                                 MAT20191
      A(I,1)=A(I,1)-VA*TC(J)                                            MAT20192
      A(2,I)=A(2,I)+VB(J)*ENU(I - 2)                                    MAT20193
340   CONTINUE                                                          MAT20194
      IF (IO) 375,375,345                                               MAT20195
345   EP=EP-VN(J)                                                       MAT20196
      IP(J)=-1                                                          MAT20197
      B(2)=B(2)-VN(J)*E(J)                                              MAT20198
      A(2,1)=A(2,1)-VB(J)*TC(J)                                         MAT20199
      IF (MODE - 2) 370,350,355                                         MAT20200
350   HOS=H(J)*VN(J)                                                    MAT20201
      GO TO 360                                                         MAT20202
355   HOS=VN(J)*(SB(J) - 1.9869 * Y(J) - 1.9869)                        MAT20203
360   DO 365 I=3,ISP2                                                   MAT20204
365   A(1,I)=HOS*ENU(I - 2)+A(1,I)                                      MAT20205
      A(1,2)=A(1,2)-HOS                                                 MAT20206
      A(1,1)=A(1,1)-HOS*TC(J)                                           MAT20207
      B(1)=B(1)-HOS*E(J)                                                MAT20208
370   CPE=CPE+VN(J)*CP(J)                                               MAT20209
375   IF (EL - EAP) 380,385,385                                         MAT20210
380   EL=EAP                                                            MAT20211
385   J=J+1                                                             MAT20212
390   CONTINUE                                                          MAT20213
      RETURN                                                            MAT20214
      END                                                               MAT20215
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      SUBROUTINE MAT3                                                   MAT30001
      DIMENSION L(10),AR(10)                                            MAT30002
C                                                                       MAT30003
      REAL NFIA(1),NFIB(1),FFIN(1),TAU(10,10)                           MAT30004
      EQUIVALENCE (NFIA(1),A(1)), (NFIB(1),A(51)), (FFIN(1),A(101)),    MAT30005
     1(TAU(1),A(151))                                                   MAT30006
      DIMENSION TF(180),CIJ(180,1)                                      MAT30007
      DIMENSION X(1),VLAM(180,1)                                        MAT30008
C                                                                       MAT30009
      COMMON           FAMOA(180),FAMOB(180),RB(180,2),RC(180,2),       MAT30010
     1                 RD(180,2),RE(180,2),RF(180,2),TU(180,2),VN(180), MAT30011
     2                 Y(180),WTM(180),VNU(180,10),FF(180),IFC(180),    MAT30012
     3                 IP(180),CP(180),H(180),SB(180),TC(180),VLNK(180), MAT30013
     4                 E(180),LAMI(180),GAMK(1,1)                       MAT30014
C                                                                       MAT30015
      COMMON /PARAM1/ KIN,KOUT,JAN,MOL,NAB,IDC,N,KKX(3),KP(10),TILE(3), MAT30016
     1                TTMIN,TTMAX,VISC,PR(1)                            MAT30017
C                                                                       MAT30018
      COMMON /PARAM2/ WM,SCH,RHO,VEL,R1,NEE,FFA,IS,ISP,P,T,SIP,HIP,     MAT30019
     1                EL,ENL,ELIQ,NG,IFL,ISPQ,KRALP,CPE,IRE,IER,AA,ITS, MAT30020
     2                IN,IL,IT,MODE,HMELT,SMELT,TMAX,TMIN,MELT,SUMN,    MAT30021
     3                SUML,JC,HG,CPG,SVA,SVB,SVC,SVD,SUMC,NXC,SA1,      MAT30022
     4                VMACH,KRZZ,SP1,GAN,THI,MX,DMCHI,HCH,NCV,TRT,      MAT30023
     5                IFRZ,NOAT,SR1,IXG,SV1,KKJ,IXC,NXG,SH1,NOATO,      MAT30024
     6                SA2,FFF,WS,RV,CMF,VA,HOS,DUM1,DUM2,EP,IFCJC,      MAT30025
     7                ISP2,WTG,VMU2,WTL                                 MAT30026
C                                                                       MAT30027
      COMMON /ARRAYS/ A(16,16),B(16),W(3),XC(50),XG(50),ZKE(10),        MAT30028
     1                TLO(10),DMCLO(10),WALJP(10),EB(10),ALP(10),       MAT30029
     2                GAMH(10),GAMF(10),TQ(10,3),TK(10,3),WAT(10),      MAT30030
     3                IP(10),IOAT(10),KAT(10),UK(10,10),EBL(10)         MAT30031
      EQUIVALENCE (TU(181),TF(1)), (VNU(1),CIJ(1))                      MAT30032
C                                                                       MAT30033
      COMMON /KINETX/ MT,FKF(50),FAK(50),FXK(50),PMU(10,50),RMU(10,50), MAT30034
     1                PMP(50),PKKK(50)                                  *COR
C                                                                       MAT30036
      EQUIVALENCE (B(1),X(1)), (GAMK(1),VLAM(1))                        **-1
C                                                                       MAT30038
      COMMON /DIFFER/ IR(11),ENU(10),PMUS(10),SLAM(10),RF(10),HY(10),   MAT30039
     1                IRC(10),JJ(10),SLB(16),SLA(16,16)                 MAT30040
C                                                                       MAT30041
      ISP3=IS+3                                                         MAT30042
      IF (MODE - 2) 50,5,25                                             MAT30043
    5 CPA=CPE*T                                                         MAT30044
      SHMLT=HMELT*VN(MELT)                                              MAT30045
      EHS=AA*HIP+A(1,2)                                                 MAT30046
      IF (KKJ+1) 20,10,20                                               MAT30047
   10 DUM1=SVA/AA*T*T                                                   MAT30048
      EHS=AA*SVC-DUM1+A(1,2)                                            MAT30049
      HIP=-A(1,2)/AA                                                    MAT30050
      A(1,2)=-AA*SVC-DUM1                                               MAT30051
      CPA=(CPE + 2. * DUM1 / T)*T                                       MAT30052
      DUM2=SVB/AA*T                                                     MAT30053
      P=P-EP                                                            MAT30054
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      55.           EP=0.                                                   MAT30055
      56.           IF (ABS(EPS/AA)-10.) 15,15,20                           MAT30056
      57.     15    EP=-P+SVD-DUM2                                          MAT30057
      58.           A(2,1)=A(2,1)+DUM2                                      MAT30058
      59.           A(2,2)=-DUM2                                            MAT30059
      60.     20    CONTINUE                                                MAT30060
      61.           GO TO 30                                                MAT30061
      62.     25    CPA=CPF                                                 MAT30062
      63.           SHMLT=SMELT*VM(MELT)                                    MAT30063
      64.           EPS=AA*SIF+A(1,2)-1.9869*(P - EP)                       MAT30064
      65.           A(1,2)=-AA*SIF                                          MAT30065
      66.     30    B(1)=B(1)+EPS                                           MAT30066
      67.           A(1,1)=A(1,1)+CPA                                       MAT30067
      68.           IF (SHMLT) 50,50,35                                     MAT30068
      69.     35    IF (EPS) 50,50,40                                       MAT30069
      70.     40    EPS=EPS-SHMLT                                           MAT30070
      71.           B(1)=B(1)-SHMLT                                         MAT30071
      72.           IF (EPS) 45,50,50                                       MAT30072
      73.     45    FLTG=1.+EPS/SHMLT                                       MAT30073
      74.           MODE=0                                                  MAT30074
      75.           A(1,1)=1.E+10                                           MAT30075
      76.           TMIN=500.                                               MAT30076
      77.           TMAX=5000.                                              MAT30077
      78.     50    ERL=ABS(EP)/P*100.                                      MAT30078
      79.           DO 75 I=3,ISP2                                          MAT30079
      80.           L(I - 2)=I-2                                            MAT30080
      81.           E(I - 2)=BE(I - 2)                                      MAT30081
      82.           ERL(I-2)=EE(I-2)*1.E-7                                  MAT30082
      83.           A(I,2)=-AA*ALP(I - 2)                                   MAT30083
      84.           IF (IEC(I - 2) - 1) 60,60,55                            MAT30084
      85.     55    NEG=NEG+1                                               MAT30085
      86.           GO TO 75                                                MAT30086
      87.     60    IF (KR(6)) 70,70,65                                     MAT30087
      88.     65    A(I,1)=A(I,1)+GAMA(I - 2)*T*CPG                         MAT30085
      89.           B(I-2)=B(I-2)+WTL*GAMF(I-2)                             MAT30089
      90.     70    ER=E(I - 2)                                             MAT30090
      91.           ARER=ABS(ER)/(EE(I - 2) + 1.E - 20)                     MAT30091
      92.           ERL=AMAX1(ARER,ERL)                                     MAT30092
      93.           B(I)=B(I)+ER                                            MAT30093
      94.     75    CONTINUE                                                MAT30094
      95.           IF (ISP2 - ISPS) 80,275,275                             MAT30095
      96.     80    IV=0                                                    MAT30096
      97.           JZ=0                                                    MAT30097
      98.     C     ADD CONDENSED PHASE SPECIES TO ARRAY                    MAT30098
      99.     85    DO 110 IE=ISP3,ISPS                                     MAT30099
     100.           J=IE-ISP2                                               MAT30100
     101.           J=JJ(J)                                                 MAT30101
     102.           IF (J-IS) 90,90,100                                     MAT30102
     103.     90    DO 95 K=1,IS                                            MAT30103
     104.     95    A(IE,K+2)=0.                                            MAT30104
     105.           A(IE,J+2)=-1.0                                          MAT30105
     106.           GO TO 110                                               MAT30106
     107.    100    DO 105 K=1,IS                                           MAT30107
     108.    105    A(IE,K+2)=-VM(J,K)                                      MAT30108
     109.    110    CONTINUE                                                MAT30109
     110.           IF (IV) 115,115,235                                     MAT30110
     111.     C     CHECK FOR SINGULAR CONDENSED SET                        MAT30111
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      115   DO 160 IE=ISP3,ISP0                                          MAT30112
            IV=IV+1                                                      MAT30113
            IF (IV - 1) 140,140,120                                      MAT30114
C     REDUCE NEW ROW BY PREVIOUS ROWS                                    MAT30115
      120   DO 135 J=2,IV                                                MAT30116
            K=L(J - 1)                                                   MAT30117
            DIV=-A(IE,K + 2)                                             MAT30118
            IF (DIV) 125,135,125                                         MAT30119
      125   A(IE,K + 2)=0.                                               MAT30120
            JM=J+ISP                                                     MAT30121
            DO 130 M=3,ISP2                                              MAT30122
      130   A(IE,M)=A(IE,M)+DIV*A(JM,M)                                  MAT30123
      135   CONTINUE                                                     MAT30124
C     SEEK VALID NON-ZERO ELEMENT                                        MAT30125
      140   DO 150 J=IV,IS                                               MAT30126
            M=L(J)                                                       MAT30127
            IF (ABS(A(IE,M + 2)) - .01) 150,150,145                      MAT30128
      145   IF (IEC(M)) 150,155,150                                      MAT30129
      150   CONTINUE                                                     MAT30130
C     SINGULAR CONDENSED SET                                             MAT30131
            GO TO 165                                                    MAT30132
      155   L(J)=L(IV)                                                   MAT30133
            L(IV)=M                                                      MAT30134
            DIV=A(IE,M + 2)                                              MAT30135
            A(IE,M + 2)=1.                                               MAT30136
C     NORMALIZE NEW ROW                                                  MAT30137
            DO 160 J=3,ISP2                                              MAT30138
      160   A(IE,J)=A(IE,J)/DIV                                          MAT30139
C     COMPLETES MAJOR LOOP=NON SINGULAR                                  MAT30140
            GO TO 85                                                     MAT30141
C     EXTRACT COEFFICIENTS ON SINGULAR SET-NONBASE                       MAT30142
      165   DO 170 J=2,IV                                                MAT30143
            K=L(J - 1)                                                   MAT30144
      170   AR(J - 1)=A(IE,K + 2)                                        MAT30145
            AR(IV)=1.                                                    MAT30146
C     EXTRACT COEFFICIENTS ON SINGULAR SET - BASE                        MAT30147
            DO 185 K=1,IS                                                MAT30148
            IF (IEC(K)) 185,185,175                                      MAT30149
      175   IF (ABS(A(IE,K + 2)) - .01) 185,185,180                      MAT30150
      180   IV=IV+1                                                      MAT30151
            AR(IV)=-A(IE,K + 2)                                          MAT30152
            JJ(IV)=K                                                     MAT30153
      185   CONTINUE                                                     MAT30154
C     ISOLATE NEW CONDENSED CANDIDATE                                    MAT30155
            DO 195 J=1,IV                                                MAT30156
            K=JJ(J)                                                      MAT30157
            IF (VN(K)) 190,190,195                                       MAT30158
      190   JZ=J                                                         MAT30159
            KZ=K                                                         MAT30160
            GO TO 200                                                    MAT30161
      195   CONTINUE                                                     MAT30162
            STOP                                                         MAT30163
C     WHO MUST GO TO ALLOW ENTRY OF NEW CANDIDATE                        MAT30164
      200   TEST=-1.0E10                                                 MAT30165
            JX=0                                                         MAT30166
            DO 220 J=1,IV                                                MAT30167
            IF (ABS(AR(J))-.01) 220,220,205                              MAT30168
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      205   DUM1=AR(JZ)/AR(J)                                          MAT30169
            IF (DUM1) 210,220,220                                      MAT30170
      210   K=JJ(J)                                                    MAT30171
            DUM1=DUM1*VN(K)                                            MAT30172
            IF (DUM1 - TEST) 220,220,215                               MAT30173
      215   TEST=DUM1                                                  MAT30174
            JX=J                                                       MAT30175
            KX=K                                                       MAT30176
      220   CONTINUE                                                   MAT30177
            IF (AR(JX) .NE. 0.0) TEST=VN(KX)/AR(JX)                                  *COR
            IF (AR(JX) .EQ. 0.0) TEST=0.0                                            *COR
C           DOES NEW CANDIDATE ENTER                                   MAT30179      **-1
            IF (E(KZ) - E(KX)) 85,85,225                               MAT30180
C           YES                                                        MAT30181
      225   DO 230 J=1,IV                                              MAT30182
            K=JJ(J)                                                    MAT30183
      230   VN(K)=VN(K)-TEST*AR(J)                                     MAT30184
            KR(7)=KR(7)+1                                              MAT30185
            VN(KX)=0.                                                  MAT30186
            KZ=KX                                                      MAT30187
            JZ=JX                                                      MAT30188
            GO TO 85                                                   MAT30189
C     ELIMINATE TERMS CORRESPONDING TO PRESENT BASE CONDENSED          MAT30190
      235   DO 250 K=1,IS                                              MAT30191
            IF (IEC(K)) 250,250,240                                    MAT30192
      240   DO 245 IE=ISP3,ISPC                                        MAT30193
      245   A(IE,K + 2)=0.                                             MAT30194
      250   CONTINUE                                                   MAT30195
            IF (JZ) 270,270,255                                        MAT30196
C     FIX MATRIX TO YIELD SMALL NEG CORRECTION ON ELIMINATED SPECIES   MAT30197
      255   IF (KX - IS) 265,265,260                                   MAT30198
      260   KZ=JZ+IS                                                   MAT30199
      265   A(KZ + 2,KZ + 2)=1.E+15                                    MAT30200
            B(KZ + 2)=-1.E+10                                          MAT30201
      270   CONTINUE                                                   MAT30202
      275   B(2)=EP+B(2)                                               MAT30203
            IF (MODE - 1) 310,290,280                                  MAT30204
      280   IF (ABS(EPS / A(1,1)) - .0001) 310,310,320                 MAT30205
      285   IF (ABS(B(1)) - 1.E - 4) 310,310,320                       MAT30206
      290   IF (IECJC) 295,285,305                                     MAT30207
      295   IF (JC - TRE) 300,305,300                                  MAT30208
      300   GO TO 285                                                  MAT30209
      305   MODE=0                                                     MAT30210
            TMIN=TTMIN                                                 MAT30211
            TMAX=TTMAX                                                 MAT30212
            GO TO 285                                                  MAT30213
      310   IF (EL - 1.E - 4) 315,315,320                              MAT30214
      315   IF (ENL - 1.E - 5) 335,335,320                             MAT30215
      320   IV=ISP2                                                    MAT30216
            IL=1                                                       MAT30217
            IF (MODE) 325,325,330                                      MAT30218
      325   IV=ISP2-1                                                  MAT30219
            IL=2                                                       MAT30220
            X(1)=0.                                                    MAT30221
      330   RETURN                                                     MAT30222
      335   IF (KR(9)) 340,340,330                                     MAT30223
      340   TTS=-2                                                     MAT30224
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226.          GO TO 330                                          MAT3n225
227.          END                                                MAT3n226
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      SUBROUTINE  PROPS                                                 PROP0001
      DIMENSION TI(1), RHO(1), CPRAF(1), SC(1), CAPC(1)                 PROP0002
      DIMENSION ZK(10),ZT(10),VK(10),VI(10)                             PROP0003
      COMMON/ACE1/GAMEX,REEK,PCH,ACHSQ,SOMAK,SXP                        PROP0004
C                                                                       PROP0005
      REAL MFIA(1),MFIP(1),FFIN(1),TAU(10,10)                           PROP0006
      EQUIVALENCE (MFIA(1),A(1)), (MFIP(1),A(51)), (FFIN(1),A(101)),    PROP0007
     1(TAU(1),A(151))                                                   PROP0008
      DIMENSION TF(180),CIJ(180,1)                                      PROP0009
      DIMENSION X(1),VLAM(180,1)                                        PROP0010
C                                                                       PROP0011
      COMMON          FAMDA(180),FAMDR(180),RB(180,2),RC(180,2),        PROP0012
     1                RO(180,2),RE(180,2),RF(180,2),TU(180,2),VN(180),  PROP0013
     2                Y(180),WTM(180),VMU(180,10),FF(180),IFC(180),     PROP0014
     3                IP(180),CP(180),H(180),SR(180),TC(180),VLMK(180), PROP0015
     4                F(180),LAMI(180),GAMK(1,1)                        PROP0016
C                                                                       PROP0017
      COMMON /PARAM1/ KIN,KOUT,JAN,MOL,NAB,IDC,N,KKX(3),KP(10),TILE(3), PROP0018
     1                TTMIN,TTMAX,VISC,PR(1)                            PROP0019
C                                                                       PROP0020
      COMMON /PARAM2/ WM,SCH,RHO,VEL,R1,NFF,FFA,TS,ISP,P,T,SIP,HIP,     PROP0021
     1                EL,ENL,ELIQ,AQ,IEL,ISPG,KEALP,CPF,IRF,IER,AA,ITS, PROP0022
     2                IN,IL,IT,MODE,NMELT,SHELT,TMAX,TMIN,MELT,SUMN,    PROP0023
     3                SUML,JC,MG,CPG,SVA,SVB,SVC,SVD,SUMC,MXC,SA1,      PROP0024
     4                VMACH,KRZZ,SP1,GA1,THI,RX,DRCHI,HCH,NCV,TRT,      PROP0025
     5                IER2,NOAT,SR1,IXG,SV1,KKJ,IXC,MXG,SH1,NOATO,      PROP0026
     6                SA2,FFF,HS,RV,CMF,VA,HOS,DUM1,DUM2,EP,IFCJC,      PROP0027
     7                ISP2,KTG,VMU2,NTL                                 PROP0028
C                                                                       PROP0029
      COMMON /ARRAYS/ A(16,16),B(16),W(3),XC(50),XG(50),ZKE(10),        PROP0030
     1                TLQ(10),DMCLQ(10),VALUP(10),FR(10),ALP(10),       PROP0031
     2                GAMH(10),GAME(10),TR(10,3),TK(10,3),WAT(10),      PROP0032
     3                IR(10),IOAT(10),KAT(10),UK(10,10),EBL(10)         PROP0033
      EQUIVALENCE (TU(1),TF(1)), (VNU(1),CIJ(1))                        PROP0034
C                                                                       PROP0035
      COMMON /KINETX/ MT,FKF(50),FAK(50),FXK(50),PNU(10,50),RNU(10,50), PROP0036
     1                PMR(50),PKK(50)                                   *COR
C                                                                       PROP0038 **-1
      EQUIVALENCE (P(1),X(1)), (GAMK(1),VLAM(1))                        PROP0039
C                                                                       PROP0040
      COMMON /DIFFER/ IR(11),FNU(10),PNUS(10),SLAM(10),BE(10),BY(10),   PROP0041
     1                IPC(10),JJ(10),SLB(16),SLA(16,16)                 PROP0042
C                                                                       PROP0043
      ALF=A(2,1)/A(1,1)                                                 PROP0044
      CSP=1./(A(1,1) * AA)                                              PROP0045
      IF (MODE - 3) 5,10,5                                              PROP0046
5     CSP=CSP/T                                                         PROP0047
10    BETA=P*(A(2,2) - A(1,2) / A(1,1) * A(2,1))-1.                     PROP0048
      GAMP=1.-ALF                                                       PROP0049
      GAMP=1./(1.+BETA-1.9869/AA*GAMP/CSP*GAMP*P)                       PROP0050
      IF (KP(5)) 15,20,15                                               PROP0051
15    GAM=GAMP                                                          PROP0052
20    ITS=-1                                                            PROP0053
      HMW=0.                                                            PROP0054
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      CAPC(1)=1.                                                        PROP0055
      II=1                                                              PROP0056
      WM=AA/P                                                           PROP0057
      ISM=IS-1                                                          PROP0058
      TT(II)=T*1.8                                                      PROP0059
      RHO(II)=AA/(1.3146 * T)                                           PROP0060
      CPRAM(II)=CPF                                                     PROP0061
      AISTR=1.13                                                        PROP0062
C     FORM NECESSARY SUMMATIONS                                         PROP0063
      PMU2=0.                                                           PROP0064
      CPTIL=0.                                                          PROP0065
      HTIL=0.                                                           PROP0066
      HTZ=0.                                                            PROP0067
      PMUZ=0.                                                           PROP0068
      PMU1=0.                                                           PROP0069
      TMU3=0.                                                           PROP0070
      CPG=0.                                                            PROP0071
      CPGPR=0.                                                          PROP0072
      IER=0                                                             PROP0073
      IF=0                                                              PROP0074
      DO 55 K=1,IS                                                      PROP0075
      VK(K)=0.                                                          PROP0076
      ZK(K)=0.                                                          PROP0077
      IF (WAT(K)-0.1) 25,30,30                                          PROP0078
25    IF=K                                                              PROP0079
30    IF (IFC(K)) 35,40,35                                              PROP0080
35    IF (KR(6)) 40,55,55                                               PROP0081
40    IF (WTM(K)-0.1) 50,50,45                                          PROP0082
45    ZK(K)=VN(K)/FF(K)                                                 PROP0083
50    VK(K)=VN(K)                                                       PROP0084
55    CONTINUE                                                          PROP0085
      I=1                                                               PROP0086
      DO 85 IK=1,N                                                      PROP0087
      IF (WTM(I)-0.1) 60,75,75                                          PROP0088
60    IER=IK                                                            PROP0089
      HE=H(I)                                                           PROP0090
      WTE=WTM(I)                                                        PROP0091
      CPE=CP(I)                                                         PROP0092
      H(I)=0.                                                           PROP0093
      WTM(I)=0.                                                         PROP0094
      CP(I)=0.                                                          PROP0095
      IF (IK-IS) 65,85,65                                               PROP0096
65    DO 70 K=1,IS                                                      PROP0097
70    VK(K)=VK(K)+VN(I)*VNU(I,K)                                        PROP0098
      GO TO 85                                                          PROP0099
75    IF (IFC(I)) 85,80,85                                              PROP0100
80    PMU1=PMU1+VN(I)*FF(I)**(1./GAMEX)                                 PROP0101
85    I=I+1                                                             PROP0102
      VMU1=PMU1/P                                                       PROP0103
      AMU5=0.                                                           PROP0104
      PMU6=0.                                                           PROP0105
      WD2=1.385                                                         PROP0106
      WD2=1.2*AISTR/PMU1                                                PROP0107
      WD7=WD2/PMU1-WD2                                                  PROP0108
      WD4=0.284*WD2                                                     PROP0109
      WD5=0.32*AISTR/PMU1                                               PROP0110
      WD6=WD4/PMU1-WD5                                                  PROP0111
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      I=1
      DO 165 IK=1,N
      IF (IFC(I)) 165,95,90
90    IF (KP(6)) 95,165,165
95    IF (WTM(I)-0.1) 165,100,100
100   VA=VN(I)/FF(I)
      IF (IFR) 130,130,105
105   IF (IK-IS) 110,110,115
110   CEJ=CIJ(IF,I)
      GO TO 125
115   CEJ=0.
      DO 120 K=1,IS
120   CEJ=CEJ+VNU(I,K)*CIJ(IF,K)
125   H(I)=H(I)-CEJ*HE
      CP(I)=CP(I)-CEJ*CPE
      WTM(I)=WTM(I)-CEJ*WTE
130   VB=VA*WTM(I)
      PMU2=PMU2+VB
      HT2=HT2+VA*H(I)
      IF (IK-IS) 145,145,135
135   DO 140 K=1,IS
      VK(K)=VK(K)+VN(I)*VNU(I,K)
140   ZK(K)=ZK(K)+VA*VNU(I,K)
145   FFI=FF(I)
      IF (IFC(I)) 155,150,155
150   FFI=FF(I)**(1./GAMEX)
155   VA=VN(I)/FFI
      VB=VA*WTM(I)
      VC=VB(I)*FFI
      PMU2=PMU2+VB
      TMU3=TMU3+VA
      CPTIL=VA*CP(I)+CPTTL
      HTTL=HTIL+VA*H(I)
      CPG=CPG+VA(I)*CP(I)
      HMW=HMW+VB(I)*H(I)
      AMU5=AMU5+VB/(WDZ -VC * WDZ )
      PMU6=PMU6+VA/(WE4 - VC * WDR )
      IF (IFC(I)) 165,160,165
160   CPGPR=CPGPR+VB(I)*CP(I)
165   I=I+1
      VMU5=AMU5/AA
      VMU6=(PMU6 + CPTIL / 1.9869 - 2.5 * TMU3)/P
      VMU2=PMU2/P
      VMU3=TMU3/PMU2
      HTZ=HT2/PMU2*1.8
      DO 170 K=1,IS
      VK(K)=VK(K)/AA*WTM(K)
170   ZK(K)=ZK(K)/PMU2*WTM(K)
      DO 175 I=1,IS
      ZI(I)=0.
      VI(I)=0.
      DO 175 K=1,IS
      VI(I)=VI(I)+CIJ(K,I)*VK(K)/WTM(K)*WAT(I)
175   ZI(I)=ZI(I)+CIJ(K,I)*ZK(K)/WTM(K)*WAT(I)
      CPG=CPG/AA
      CPGPR=CPGPR/AA
      HMW=HMW/AA
```

```
PROP0112
PROP0113
PROP0114
PROP0115
PROP0116
PROP0117
PROP0118
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PROP0123
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PROP0163
PROP0164
PROP0165
PROP0166
PROP0167
PROP0168
```

```
      CPTIL=CPTIL/PMU2                                                  PROP0169
      HTIL=HTIL/PMU2*1.8                                                PROP0170
      OMEGA=1.07/(T / 106.7)**0.159                                     PROP0171
      DBAR=4.16E-8*T/P*SQRT(T)/OMEGA                                    PROP0172
      VMU=RHO(II)*DBAR*VMU5/VMU1                                        PROP0173
      TCOND=RHO(II)*DBAR*WM*VMU6/VMU1*1.9869                            PROP0174
      SC(II)=VMU5/VMU2*WM                                               PROP0175
      PR(II)=CPSPR/VMU6*VMU5/1.9869*WM                                  PROP0176
      IF (KKJ) 205,205,180                                              PROP0177
180   GAME=GAM-1.0                                                      PROP0178
      SQMAK=(HCH-HMW)/GAM*1.0065/T*WM                                   PROP0179
      PSP=((1.+GAME/2.*SQMAK)/(1.+GAME/2.*ACHSQ))**(GAM/GAME)           PROP0180
      IF (ABS(PSP-1.0)-1.E-4) 200,200,185                               PROP0181
185   IF (KKJ-10) 190,190,195                                           PROP0182
190   P=P*PSP                                                           PROP0183
      AA=P*WM                                                           PROP0184
      KKJ=KKJ+1                                                         PROP0185
      ITS=IT                                                            PROP0186
      GO TO 240                                                         PROP0187
195   NCV=1                                                             PROP0188
200   KKJ=0                                                             PROP0189
205   IF (NCV) 215,215,210                                              PROP0190
210   WRITE (KOUT,255)  TILE                                            PROP0191
      GO TO 225                                                         PROP0192
215   IF (KR(10)/2 +KR(7) +KR(2) +KR(3)) 225,225,220                    PROP0193
220   WRITE (KOUT,250)  TILE                                            PROP0194
  225 IF (KR(6)) 226,227,227                                            *COR
  226 WRITE(KOUT,245) CPG,CSP,ALF,BETA,GAMP                             *COR
      GO TO 229                                                         *COR
  227 WRITE(KOUT,228) CPG                                               *COR
  228 FORMAT(/10X,11H CP-FROZEN=  ,E12.5)                               *COR
  229 CONTINUE                                                          *COR
      VMU12=VMU1*VMU2                                                   PROP0196  **-1
      IF (KKX(1)-4) 235,230,235                                         PROP0197
230   HMW=HMW*1.8                                                       PROP0198
      PUNCH 260,  HMW, TT, WM, CSP, ALF, VMU, PR                        PROP0199
235   CONTINUE                                                          PROP0200
      WRITE (KOUT,265) TT,VMU,TCOND,DBAR,PR,SC,VMU1,VMU2,WM,HTIL,CPTIL  PROP0201
     1   ,HTZ                                                           PROP0202
      WRITE (KOUT,275)  GAMEX,(KAT(J),J=1,IS)                           PROP0203
      WRITE (KOUT,270) (VI(J),J=1,IS)                                   PROP0204
      WRITE (KOUT,270) (ZI(J),J=1,IS)                                   PROP0205
240   RETURN                                                            PROP0206
C                                                                       PROP0207
245   FORMAT (/27H DERIVATIVE PROPERTY OUTPUT,/57H  CP-FROZEN    CP-EQUIPROP0208
     1L   DLNM/DLNT   DLNM/DLNP     GAMMA,/5E12.5)                     PROP0209
250   FORMAT (1H115X45HGRAPHITE SURFACE KINETICS (GASKET) SOLUTION   5X PROP0210
     1  2A4,A2//)                                                      PROP0211
255   FORMAT  (4H1---50H-----FOLLOWING OUTPUT NON-CONVERGENT----------PROP0212
     1-- 2A4,A2//)                                                     PROP0213
260   FORMAT (6E12.5,F8.4)                                            PROP0214
265   FORMAT (/58H PROPERTY ROUTINE OUTPUT IN  LB-MASS,FT,SEC,BTU,AND DEPROP0215
     16-R    /67H    TEMP         VISC         COND         DBAR         PRPROP0216
     2          SC/6E12.5/57H     MU1          MU2        MOL.WT        HTIPROP0217
     3L        CPTIL7X5HHTIL*/6E12.5)                                  PROP0218
270   FORMAT (1X10E12.5)                                              PROP0219
275   FORMAT (/58H ELEMENTAL K AND Z MASS FRACTIONS BY ATOMIC NUMBER . .PROP0220
```

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226.          1 . . 9H (GAMFX =F6.3,1H)/1X10(4XI3,5X))                    PROP0221
227.           END                                                        PROP0222
```

```
      SUBROUTINE SCALE (*GE)                                                    SCAL0001
      DIMENSION CREF(180)                                                       SCAL0002
      DIMENSION DY(1),DYA(180,1)                                                SCAL0003
C                                                                               SCAL0004
      REAL BETA(1),BETB(1),EFIN(1),TAU(10,10)                                   SCAL0005
      EQUIVALENCE (BETA(1),A(1)), (BETP(1),A(51)), (EFIN(1),A(101)),            SCAL0006
     1(TAU(1),A(151))                                                           SCAL0007
      DIMENSION TE(180),CIJ(180,1)                                              SCAL0008
      DIMENSION X(1),VLAM(180,1)                                                SCAL0009
C                                                                               SCAL0010
      COMMON          EA(DA(180),EA(DB(180),EM(180,2),RC(180,2),                SCAL0011
     1                RM(180,2),RE(180,2),RF(180,2),TU(180,2),VN(180),          SCAL0012
     2                Y(180),ETE(180),VMU(180,10),EE(180),IEC(180),             SCAL0013
     3                IP(180),CP(180),H(180),SH(180),TC(180),VLAM(180),         SCAL0014
     4                E(180),IAPT(180),GAMA(1,1)                                SCAL0015
C                                                                               SCAL0016
      COMMON /PASAM1/ KIN,KOUT,JAN,NOL,JAP,IEC,D,KKX(3),KR(10),TTLE(3),         SCAL0017
     1                TTMIN,TTMAX,VISC,PR(1)                                    SCAL0018
C                                                                               SCAL0019
      COMMON /PARAM2/ PI,SCH,RHO,VEL,H1,DEE,EEA,IS,ISP,P,T,SIP,HIP,             SCAL0020
     1                EL,ENL,ELTG,NO,IEL,ISPG,KRALP,CPF,IRE,TEK,AA,TTS,         SCAL0021
     2                IN,IL,IT,MODE,HMELT,SMELT,TMAX,TMIN,MELT,SUMN,            SCAL0022
     3                SUML,JC,HG,CPG,SVA,SVB,SVC,SVD,SUMC,AXC,SA1,              SCAL0023
     4                VMACH,KP22,SP1,GAP,THT,MX,DXCHT,HCH,NCV,THT,              SCAL0024
     5                IEP2,NOAT,SP1,IXG,SV1,KKJ,TXC,NXG,SH1,NOATO,              SCAL0025
     6                SC2,EFF,KS,PV,CMF,VA,HOS,SUM1,SUM2,FP,IECJC,              SCAL0026
     7                ISP2,PTG,VMU2,STL                                         SCAL0027
C                                                                               SCAL0028
      COMMON /ARRAYS/ A(16,16),F(16),W(3),XC(50),XG(50),ZKF(10),                SCAL0029
     1                TLG(10),DPCLO(10),VALUP(10),FB(10),ALP(10),               SCAL0030
     2                GAMM(10),GAMF(10),TO(10,5),TK(10,3),WAT(10),              SCAL0031
     3                IP(10),IOAT(10),KAT(10),UK(10,10),FRL(10)                 SCAL0032
      EQUIVALENCE (TU(1,1),TE(1)), (VMU(1),CIJ(1))                              SCAL0033
C                                                                               SCAL0034
      COMMON /KINETX/ PI,FKF(50),FAK(50),FXK(50),PMU(10,50),RMU(10,50),         SCAL0035
     1                PKP(50),PKKK(50)                                          SCAL0036
C                                                                               SCAL0037
      EQUIVALENCE (P(1),X(1)), (GAM(1),VLAM(1))                                 SCAL0038
C                                                                               SCAL0039
      COMMON /DIFFEX/ T(11),DIU(10),PMUS(10),SLAM(10),BE(10),BY(10),            SCAL0040
     1                IC(10),JJ(10),SLM(16),SLA(16,16)                          SCAL0041
C                                                                               SCAL0042
      EQUIVALENCE (A(1),DY(1),DYZ(1))                                           SCAL0043
      ELTH=AMAX1(1.,E(2) + E(3))*0.20*TG                                        SCAL0044
      D*TL=0.                                                                   SCAL0045
      DWIG=0.                                                                   SCAL0046
      DUMP=P*1.E-7                                                              SCAL0047
      RUMP=P*1.E-4                                                              SCAL0048
      RUMP=ALOG(RUMP)                                                           SCAL0049
      CPF=1.                                                                    SCAL0050
    5 K=0                                                                       SCAL0051
      DO 20 J=2,IS                                                              SCAL0052
      IF (IP(J) - IP(J - 1)) 10,15,20                                           SCAL0053
   10 JA=IP(J)                                                                  SCAL0054
```

*COR
**-1

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      IB(J)=IB(J - 1)                                                    SCAL0055
      IP(J - 1)=JA                                                       SCAL0056
      K=1                                                                SCAL0057
      GO TO 20                                                           SCAL0058
15    IB(J)=1000                                                         SCAL0059
20    CONTINUE                                                           SCAL0060
      IF (K) 25,25,5                                                     SCAL0061
25    IB(IS + 1)=1000                                                    SCAL0062
      M=TS(I)                                                            SCAL0063
      M1=1                                                               SCAL0064
      L=IS+2                                                             SCAL0065
      I=0                                                                SCAL0066
      LL=1                                                               SCAL0067
      LIM=M+KK(2)                                                        SCAL0068
      DO 280 IK=1,LIM                                                    SCAL0069
      I=I+1                                                              SCAL0070
      IF (IK - IS) 30,30,45                                              SCAL0071
30    SLAN(I)=0.                                                         SCAL0072
      IBC(I)=IFC(I)                                                      SCAL0073
      PHIS(I)=0.                                                         SCAL0074
      IF (IFC(I) - 1) 35,35,75                                           SCAL0075
35    DYI=X(I + 2)                                                       SCAL0076
      IF (IFC(I) + 1) 275,40,40                                          SCAL0077
40    IF (IFC(I)) 205,95,230                                             SCAL0078
45    IF (IFC(I) + 1) 75,50,50                                           SCAL0079
50    IF (IFC(I)) 70,55,65                                               SCAL0080
55    VA=E(I)-TC(I)*X(1)                                                 SCAL0081
      DO 65 J=1,IS                                                       SCAL0082
      IF (IFC(J)) 60,60,65                                               SCAL0083
60    VA=VA+VNU(I,J)*X(J + 2)                                            SCAL0084
65    CONTINUE                                                           SCAL0085
      DYI=VA                                                             SCAL0086
      GO TO 95                                                           SCAL0087
70    IF (IK - IRE) 75,60,75                                             SCAL0088
75    DYI=0.                                                             SCAL0089
      GO TO 275                                                          SCAL0090
80    IFC(I)=1                                                           SCAL0091
      DYI=X(IER)                                                         SCAL0092
      GO TO 230                                                          SCAL0093
85    L=L+1                                                              SCAL0094
      IF (L - IRR) 90,85,90                                              SCAL0095
90    DYI=X(L)                                                           SCAL0096
      GO TO 230                                                          SCAL0097
95    DWTG=DWTG+VN(I)*DYI*WTM(I)                                         SCAL0098
      IF (IP(I)) 100,195,100                                             SCAL0099
100   IF (IK - M) 105,145,105                                            SCAL0100
105   IF (VN(I) - BUMP) 110,140,140                                      SCAL0101
110   IF (MOE) 195,195,115                                               SCAL0102
115   IF (DYI) 120,275,125                                               SCAL0103
120   IF (VN(I) / BUMP - .9999995 - CMF * DYI) 275,275,130               SCAL0104
125   IF (BUMP / VN(I) - 1. - CMF * DYI) 135,275,275                     SCAL0105
130   CMF=(VN(I) / BUMP - .9999995)/DYI                                  SCAL0106
      GO TO 275                                                          SCAL0107
135   CMF=(BUMP / VN(I) - 1.)/DYI                                        SCAL0108
      GO TO 275                                                          SCAL0109
140   IF (MOE) 175,175,150                                               SCAL0110
145   M1=M1+1                                                            SCAL0111
```

```
      M=IB(M1)                                                          SCAL0112
  150 IF (DYI) 155,275,160                                              SCAL0113
  155 IF (DYI * CMF + .999) 165,275,275                                 SCAL0114
  160 IF (DYI * CMF - 9.) 275,275,170                                   SCAL0115
  165 CMF=-.999/DYI                                                     SCAL0116
      GO TO 275                                                         SCAL0117
  170 CMF=9./DYI                                                        SCAL0118
      GO TO 275                                                         SCAL0119
  175 IF (DYI * CMF - 2.303) 180,190,190                                SCAL0120
  180 IF (DYI * CMF + 6.909) 185,275,275                                SCAL0121
  185 CMF=-6.909/DYI                                                    SCAL0122
      GO TO 275                                                         SCAL0123
  190 CMF=2.303/DYI                                                     SCAL0124
      GO TO 275                                                         SCAL0125
  195 IF (Y(I) - BULP + ABS(DYI) * CMF) 275,200,200                     SCAL0126
  200 CMF=-(Y(I) - BULP)/ABS(DYI)                                       SCAL0127
      GO TO 275                                                         SCAL0129
C     NON-PRESENT BASE                                                  SCAL0129
  205 IF (KR(6)) 215,210,210                                            SCAL0130
  210 IF (T - TF(I) + .001) 275,215,215                                 SCAL0131
  215 IF (Y(I) + CMF * DYI - 0.1) 275,220,220                           SCAL0132
  220 DUM1=(.1 - Y(I))/DYI                                              SCAL0133
      IF (DUM1 - .001) 275,275,225                                      SCAL0134
  225 CMF=DUM1                                                          SCAL0135
      GO TO 275                                                         SCAL0136
  230 DWTL=DWTL+DYI*WTM(I)                                              SCAL0137
      IF (DYI) 235,275,250                                              SCAL0138
  235 IF (VN(I)) 250,250,240                                            SCAL0139
  240 IF (VN(I) + DYI * CMF) 245,250,250                                SCAL0140
  245 CMF=-VN(I)/DYI*1.00001                                            SCAL0141
  250 IF (KR(6)) 265,255,255                                            SCAL0142
  255 CLIP=ABS(CLIM/WTM(I))                                             SCAL0143
      IF (ABS(CMF * DYI) - CLIP) 275,275,260                            SCAL0144
  260 CMF=CLIP/ABS(DYI)                                                 SCAL0145
      GO TO 275                                                         SCAL0146
  265 IF (ABS(CMF * DYI) - P) 275,275,270                               SCAL0147
  270 CMF=P/ABS(DYI)                                                    SCAL0148
  275 CMFF(I)=CMF                                                       SCAL0149
  280 DY(IK)=DYI                                                        SCAL0150
      IF (KR(6)) 290,285,285                                            SCAL0151
  285 RVL=AMAX1(.1,RV/2.)                                               SCAL0152
      CMF=AMIN1(CMF,WTG / ABS(ABS(DWTL - DWTG / WTG * WTL) / RVL - DWTG)SCAL0153
     1)                                                                 SCAL0154
  290 IF (KR(7)-1) 300,300,295                                          SCAL0155
  295 NO=I                                                              SCAL0156
      WRITE (KOUT,350) (FAMOA(J),VN(J),Y(J),DYA(J,LL),CMFF(J),F(J),IFC(JSCAL0157
     1),IP(J),J=1,NO)                                                   SCAL0158
      WRITE (KOUT,360) (FR(I),I=1,IS)                                   SCAL0159
      WRITE (KOUT,360) (X(I),I=1,ISEQ)                                  SCAL0160
      WRITE (KOUT,355) (TB(I),I=1,IS)                                   SCAL0161
  300 CONTINUE                                                          SCAL0162
      IF (X(1)) 305,345,305                                             SCAL0163
  305 X1=X(1)*CMF                                                       SCAL0164
      ABX=ABS(X(1))                                                     SCAL0165
      IF (ABS(X1) - .5) 315,315,310                                     SCAL0166
  310 CMF=.5/ABX                                                        SCAL0167
      X1=CMF*X(1)                                                       SCAL0168
```

```
      315   IF (X1) 325,345,320                                              SCAL0169
      320   TM=TMAX                                                          SCAL0170
            X1=AMIN1(.2,X1)                                                  SCAL0171
            GO TO 330                                                        SCAL0172
      325   TM=TMIN                                                          SCAL0173
            X1=AMAX1( - 0.2,X1)                                              SCAL0174
      330   DTM=(TM - T)/(TP * X1)                                           SCAL0175
            IF (DTM - 1.) 335,340,340                                        SCAL0176
      335   CHF=DTM*CHF                                                      SCAL0177
            T=TM                                                             SCAL0178
            GO TO 345                                                        SCAL0179
      340   T=T/(1. - X1)                                                    SCAL0180
      345   AA=AA*EXP(CHF * X(2))                                            SCAL0181
            RETURN                                                           SCAL0182
      C                                                                      SCAL0183
     -350   FORMAT  (1X2(8X2HVM9X1HY8X2HDY7X5HSCALE7X1HE4X5HIFC IP)/(1XA4,5E  SCAL0184
           1 10.3,I3,I2,1X,A4,5E10.3,I3,I2))                                 SCAL0185
      355   FORMAT (10I5)                                                    SCAL0186
      360   FORMAT (8F12.4)                                                  SCAL0187
            END                                                              SCAL0188
```

SECTION 3

SAMPLE PROBLEMS

Presented in this section are three sample problems which were run on a Univac 1108 digital computer. An attempt was made to utilize almost all of the options available in the GASKET2 program. For each sample problem, the following is presented:

- A brief description of the nature of the problem and solution
- A listing of the input data deck
- A few typical pages of the program output

Sample Problem 1

In this problem, ablation rates at the throat of a rocket nozzle are calculated. The propellant gases are comprised of seven elements, including both hydrogen and oxygen. The surface material option of ATJ bulk graphite is used. The program options which utilize built-in physical data are selected; hence, only 10 cards of input data are required for the complete sequence of calculations. The ideal chamber conditions (propellant flame temperature of 3764°K, ideal pressure of 68.02 atm) are input. After redefining the elemental set to include the fictitious element "GRAPHITE," subsequent calculations performed by the program include determination of the actual chamber state (54.42 atm) and an isentropic expansion to the throat (unity Mach no.). The frozen edge state is computed for the built-in array of eight temperatures, and the surface ablation rate is computed for the built-in array of fifteen surface temperatures.

Listing of Input

```
 1.    3005110400  3764.      54.42      -1.0       68.02      0.969      0.
 2.      7
 3.      1 HYDROGEN       1.008       3.3192
 4.      4 BERYLLIUM      9.012       1.4265
 5.      6 CARBON        12.011       0.9236                  1.0
 6.      7 NITROGEN      14.007       0.7352
 7.      8 OXYGEN        16.0         1.9161
 8.      9 FLUORINE      19.0         0.8640
 9.     17 CHLORINE      35.453       0.4012
10.    8
```

Sample Problem 1 Output

```
        GRAPHITE SURFACE KINETICS (GASKET) #300, 1          0110000*00

RELATIVE ELEMENTAL COMPOSITIONS, ATOMIC MIS/UNIT MASS
   AT.NO.    ELEMENT      ATOMIC PT      EDGE GAS       SURFACE
      1      HYDROGEN       1.00800      .0330707      .0000000
      4      BERYLLIUM      9.01200      .0142129      .0000000
      6      CARBON        12.01100      .0092023      .0000000
      7      NITROGEN      14.00700      .0063215      .0000000
      8      OXYGEN        15.99900      .0150910      .0000000
      9      FLUORINE      18.99840      .0086483      .0000000
     17      CHLORINE      35.45300      .0034973      .0000000
    106      GRAPHITE      12.01100      .0000000      .0832570

 ELEMENTS          HYDROGEN      BERYLLIUM     CARBON        NITROGEN      OXYGEN
                   FLUORINE      CHLORINE      GRAPHITE

 BASE SPECIES      H2            BE            C02           CCLN          H20
                   FH            CLH           C*
```

Sample Problem 1 Output (Continued)

```
                GRAPHITE SURFACE KINETICS (GASKET) SOLUTION        PROB. 1


DERIVATIVE PROPERTY OUTPUT
 CP-FROZEN     CP-EQUIL    DLNM/DLNT    DLNM/DLNP     GAMMA
  .49545+00    .12580+01   -.57602+00    .35229-01    .1133A+01

PROPERTY ROUTINE OUTPUT IN  LB-MASS,FT,SEC,BTU,AND DEG-R
    TEMP          VISC          COND          DBAR          PR            SC
  .67752+04     .61615-04     .75106-04     .23259-03    .31461+00     .72427+00
    MU1           MU2          MOL.WT         HTIL         CPTIL         HTIL*
  .77605+00     .20648+02     .25599+02     .42582+04    .8699A+00     .23A4A+04

ELEMENTAL K AND Z MASS FRACTIONS BY ATOMIC NUMBER . . . . (GAMFX =  .667)
      1             4             6             7             A             9            17            104
   .33335-01     .12809+00     .11053+00     .11656+00     .30546+00     .16432+00     .14172+00     .00000
   .89675-01     .69022-01     .13622+00     .14390+00     .23818+00     .17803+00     .1449A+00     .00000

SOLUTION TIMES
        ITERATIONS =   32                          TIME =    9.2A7 SEC.

CLOSED SYSTEM EQUILIBRIUM SOLUTION OUTPUT

  MASS CONDENSED/MASS GAS =    .21215+00
  TEMP =  6775.2000 DEG R.  =  3764.0000 DEG K.      PRESS =     68.02000 ATM

                               GAS            CONDENSED        COMPOSITE
  ENTHALPY - BTU/LBM           .24931+03       -.58624+04       -.78736+03
  ENTROPY - BTU/LBM DEG R      .24060+01        .15349+01        .25835+01
  DENSITY - LBM/FT3            .29030+00                         .35189+00
  MOLECULAR WEIGHT             21.1184          25.0120          25.5946

 CHEMICAL STATE  (MOLE FR. = MOLECULES / TOTAL GAS PHASE MOLECULES).....

   SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.
   CO2       .286A1-02     H2        .51374+00     H2O       .32153-01     C*        .00000        CLH       .39942-01
   FH        .26427-01     BE        .37865-02     CCLN      .A9119-07     CO        .23259+00     C2H2      .31456-07
   C         .12442-04     C2        .66064-10     CS        .21189-12     C4        .A4802-18     C5        .92557-21
   C2BE      .74619-09     HECL      .37108-02     HECLF     .3621A-01     4ECL2     .82985-02     HEF       .43163-01
   BEF2      .40630-01     HEH0      .66279-02     HEH2      .1949A-03     3EH2O2    .38210-02     HEO       .25368-03
   BE2CL4    .35445-07     BE2O2     .27032-03     BE3O3     .24759-03     4E4O4     .85633-04     BE5O5     .31056-05
   BE6O6     .20125-06     CCL       .36754-08     CCLFO     .59481-09     CCLF3     .79560-17     CCL2O     .24220-09
   CCL3F     .438A0-17     CCL4      .12540-17     CF        .21656-07     CFN       .44796-08     CF2       .12010-09
   CF2O      .420A2-09     CF3       .70361-14     CF4       .41132-17     CH        .10493-06     CHCLF2    .96091-14
   CHCL2F    .86893-14     CHCL3     .47047-14     CHFO      .79573-07     CHF3      .43854-14     CHN       .51285-04
   CHNO      .95549-06     CHO       .45571-04     CH2       .57441-07     CH2CLF    .28644-11     CH2CL2    .37433-11
   CH2F2     .10232-11     CH2O      .27401-05     CH3       .44354-06     CH3CL     .10870-08     CH3F      .23177-09
   CH4       .97096-07     CN        .24543-05     C2F2      .1A879-15     C2F4      .28364-22     C2H4      .23420-10
   C2H4O     .19643-14     C2N2      .24A40-09     C3O2      .41003-10     C4N2      .75546-17     CL        .54432-02
   CLF       .84859-07     CLF03     .60026-24     CLF3      .87612-21     CLHO      .17413-05     CLNO      .18065-07
   CLO       .15244-05     CLO2      .89297-11     CL2O      .85230-11     F         .11110-03     FHO       .13169-07
   FN        .68111-08     FNO       .10759-08     FO        .39131-08     F2O       .52961-15     F3N       .24583-19
   H         .69679-01     HN        .40321-04     HO        .38114-02     H2N       .29586-04     H2O2      .53748-07
   H3N       .18218-04     H4N2      .45197-11     N         .27902-04     NO        .36568-03     NO2       .94106-08
   N2O       .58770-07     N2O3      .10572-15     N2O4      .28330-21     N2O5      .17632-25     O         .44951-03
   O3        .22818-11     CCL2F2    .72649-17     CCLO      .51757-05     CFO       .14886-06     C2F6      .68667-30
   FNO2      .41704-14     CLNO2     .41138-13     F2N       .62872-13     FNO3      .19497-20     HNO       .83093-06
   BEN       .17185-04     HNO2      .20359-08     HNO3      .18560-13     BE2O      .10682-02     F4N2      .16499-32
   HO2       .12061-06     NO3       .47547-14     CF4O      .84379-23     CCL2      .82626-10     CCL3      .16171-13
   F2N2      .42902-17     H2N2      .28486-08     BE2F2O    .17103-01     CN2       .88652-09     C2O       .24565-07
   CLF5      .11741-36     BEH       .65541-15     FO2       .24159-11     C2H       .12574-07     C2N       .95277-09
   C2CL4     .12864-20     C2CL6     .28053-30     C2HF      .67411-11     C2CL2     .17562-12     C2HCL     .15177-09
   CHCL      .40746-08     CHF       .35808-08     C2F3N     .17697-19     F3NO      .16489-24     F2        .31941-10
   CL2       .30764-05     N2        .10623+00     O2        .14692-04     CNO       .14911-06     N3        .83700-09
   C2H3      .71395-10     C2H6      .84166-14     C3H       .61907-11     C3H2      .56004-12     C3H3      .97489-13
   C3H4      .45085-14     C3H5      .20283-13     C4H       .39389-14     C4H2      .57922-15     CLH4N4*   .00000
   CLH4NO4*  .00000        BEH2O2*   .00000        BE*       .00000        BEO*      .17912+00     CBE2*     .00000
   BE3N2*    .00000        BECL2*    .00000        BEF2*     .00000
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Sample Problem 1 Output (Continued)

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        GRAPHITE SURFACE KINETICS (GASKET) PROB. 1        2000200+00

DERIVATIVE PROPERTY OUTPUT
 CP-FROZEN     CP-EQUIL    DLNM/DLNT    DLNM/DLNP     GAMMA
 .99506+00    .13039+01   -.60504+00    .36699-01    .11327+01

PROPERTY ROUTINE OUTPUT IN  LB-MASS,FT,SEC,PTU,AND DEG-R
   TEMP          VISC          COND          DBAR          PR            SC
 .67212+04    .61287-04    .74620-04    .28689-03    .31494+00    .72426+00
   MU1           MU2         MOL.WT         HTIL          CPTIL        HTIL*
 .77499+00    .20619+02    .25514+02    .43013+04    .86896+00    .24063+04

ELEMENTAL K AND Z MASS FRACTIONS BY ATOMIC NUMBER . . . . (GAMFX =  .6671
     1            4            6            7            8            9           17          106
  .33335-01    .12809+00    .11053+00    .11656+00    .30546+00    .16432+00    .14172+00    .00000
  .89582-01    .69338-01    .13601+00    .14368+00    .23836+00    .17807+00    .14496+00    .00000

SOLUTION TIMES
        ITERATIONS =    3                        TIME =    1.249 SEC.

CLOSED SYSTEM EQUILIBRIUM SOLUTION OUTPUT

  MASS CONDENSED/MASS GAS =    .21135+00
  TEMP =  6721.2491 DEG R.  =  3734.0273 DEG K.     PRESS =     54.42000 ATM

                                GAS          CONDENSED       COMPOSITE
  ENTHALPY - BTU/LBM           .29254+03     -.58969+04      -.78736+03
  ENTROPY - BTU/LBM DEG R      .28272+01      .15297+01       .26009+01
  DENSITY - LBM/FT3            .23351+00                      .28286+00
  MOLECULAR WEIGHT            21.0627        25.0120         25.5143

 CHEMICAL STATE  (MOLE FR. = MOLECULES / TOTAL GAS PHASE MOLECULES).....

   SPECIES   MOLE FR.    SPECIES   MOLE FR.    SPECIES   MOLE FR.    SPECIES   MOLE FR.    SPECIES   MOLE FR.
   CO2      .29143-02    H2       .31040+00    H2O      .32357-01    C*       .00000    CLH      .40019-01
   FH       .26414-01    BE       .40393-02    CCLN     .67381-07    CO       .23178+00    C2H2     .19219-07
   C        .10485-06    C2       .43831-10    C3       .11548-12    C4       .35696-18    C5       .31450-21
   C2BE     .49368-09    BECL     .37336-02    BECLF    .35728-01    BECL2    .81426-02    BEF      .44295-01
   BEF2     .40404-01    BEHO     .67278-02    BEH2     .17333-03    BEH2O2   .37582-02    BEO      .27204-03
   BE2CL4   .27308-07    BE2O2    .29386-03    BE3O3    .27990-03    BE4O4    .97476-04    BE5O5    .35546-05
   BE6O6    .23314-06    CCL      .28819-08    CCLFO    .46249-09    CCLF3    .49421-17    CCL2O    .19074-09
   CCL3F    .26948-17    CCL4     .77082-18    CF       .17226-07    CFN      .33543-08    CF2      .89340-10
   CF2O     .33469-09    CF3      .47004-14    CF4      .25784-17    CH       .81195-07    CHCLF2   .60000-14
   CHCL2F   .54144-14    CHCL3    .29411-14    CHFO     .63030-07    CHF3     .27583-14    CHN      .39842-04
   CHNO     .75218-06    CHO      .38831-04    CH2      .42021-07    CH2CLF   .18030-11    CH2CL2   .23708-11
   CH2F2    .64383-12    CH2O     .21617-05    CH3      .30546-06    CH3CL    .69674-09    CH3F     .14695-09
   CH4      .62909-07    CN       .19863-05    C2F2     .10752-15    C2H4     .13398-22    C2H4     .11840-10
   C2H4O    .97335-15    C2N2     .14962-09    C3O2     .25240-10    C4N2     .28097-17    CL       .62048-02
   CLF      .79011-07    CLFO3    .47634-24    CLF3     .58376-21    CLHO     .16640-05    CLNO     .16569-07
   CLO      .15549-05    CLO2     .86633-11    CL2O     .76640-11    F        .11359-03    FHO      .12049-07
   FN       .59609-08    FNO      .97331-09    FO       .37407-08    F2O      .43854-15    F3N      .16507-19
   H        .73024-01    HN       .36701-04    HO       .40034-02    H2N      .25088-04    H2O2     .50038-07
   H3N      .14492-04    H4N2     .27351-11    N        .27506-04    NO       .38019-03    NO2      .94613-08
   N2O      .54463-07    N2O3     .88768-16    N2O4     .22938-21    N2O5     .13586-25    O        .54582-03
   O3       .23779-11    CCL2F2   .44826-17    CCLO     .44727-05    CFO      .12598-06    C2F6     .26883-30
   FNO2     .36221-14    CLNO2    .36384-13    F2N      .48535-13    FNO3     .15578-20    HNO      .76683-06
   BEN      .15949-04    HNO2     .18689-08    HNO3     .16414-13    BF2O     .11155-02    F4N2     .79529-33
   HO2      .12141-06    NO3      .44848-14    CF4O     .44198-23    CCL2     .60609-10    CCL3     .10865-13
   F2N2     .29146-17    H2N2     .21249-08    BE2F2O   .16646-01    CN2      .63233-09    C2O      .17837-07
   CLF5     .55342-37    BEH      .50405-15    FO2      .22864-11    C2H      .81308-08    C2N      .60477-09
   C2CL4    .62617-21    C2CL6    .10766-30    C2HF     .39815-11    C2CL2    .10515-12    C2HCL    .92045-10
   CHCL     .29571-08    CHF      .26186-08    C2F3N    .85521-20    F3NO     .11894-24    F2       .27915-10
   CL2      .29698-05    N2       .10589+00    O2       .22352-04    CNO      .12322-06    N3       .66642-09
   C2H3     .38503-10    C2H6     .34929-14    C3H      .31964-11    C3H2     .26160-12    C3H3     .42035-13
   C3H4     .17873-14    C3H5     .72249-14    C4H      .15952-14    C4H2     .21827-15    CLH4N*   .00000
   CLH4NO4* .00000       BEH2O2*  .00000       BE*      .00000       BEO*     .17798+00    CBE2*    .00000
   BE3N2*   .00000       BECL2*   .00000       BEF2*    .00000
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Sample Problem 1 Output (Continued)

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        GRAPHITE SURFACE KINETICS (GASKET) PROB. 1          3000100+00

DERIVATIVE PROPERTY OUTPUT
 CP-FROZEN     CP-EQUIL    DLNM/DLNT    DLNM/DLNP      GAMMA
  .49587+00    .12511+01   -.54367+00    .31434+01    .11302+01

PROPERTY ROUTINE OUTPUT IN  LBM-MASS,FT-SEC-BTU-AND DEG-R
    TEMP          VISC          COND          DBAR          PR            SC
  .63793+04     .59220-04     .72322-04     .45482-03     .30975+00     .72433+00
    MU1           MU2          MOL.WT         HTIL          CPTIL         HTIL*
  .77413+00     .20596+02     .25806+02     .38464+04     .87149+00     .20679+04

ELEMENTAL K AND Z MASS FRACTIONS BY ATOMIC NUMBER . . . . (GAMFX =  .667)
       1             4             6             7             8             9            17           106
    .33335-01     .12809+00     .11053+00     .11656+00     .30546+00     .16432+00     .14172+00     .00000
    .91019-01     .65809-01     .13771+00     .14546+00     .33395+00     .17956+00     .14659+00     .00000

SOLUTION TIMES
        ITRATIONS =    6                        TIME =    2.331 SEC.

CLOSED SYSTEM EQUILIBRIUM SOLUTION OUTPUT

  MASS CONDENSED/MASS GAS =    .22523+00
  TEMP =  6379.3015 DEG R.  =  3544.0564 DEG K.      PRESS =     31.47837 ATM

                                GAS              CONDENSED        COMPOSITE
  ENTHALPY - BTU/LBM            .72630+02        -.61156+04        -.10649+04
  ENTROPY - BTU/LBM DEG R       .29496+01         .14963+01         .26009+01
  DENSITY - LBM/FT3             .14230+00                           .17436+00
  MOLECULAR WEIGHT              21.0621           25.0120           25.8059

 ABOVE ARE STATIC PROPERTIES                 H-KINETIC =    .27759+03 BTU/LBM
  VEL. =     .3728+04 FT/SEC    FLUX =    .84996+03 LBM/FT2SEC   MACH =   1.00004

 CHEMICAL STATE  (MOLE FR. = MOLECULES / TOTAL GAS PHASE MOLECULES).....

   SPECIES   MOLE FR.     SPECIES   MOLE FR.     SPECIES   MOLE FR.     SPECIES   MOLE FR.     SPECIES   MOLE FR.
   CO2       .27318-02    H2        .32262+00    H2O       .30264-01    C*        .00000     CLM       .41121-01
   FH        .26684-01    HE        .29798-02    CCLM      .36403-07    CO        .23469+00  C2H2      .84514-08
   C         .42832-07    C2        .12001-10    C3        .24174-13    CH        .51448-19  C5        .36040-22
   C2RE      .16436-09    BECL      .28719-02    HFCLF     .37215-01    BECL2     .81873-02  HEF       .38901-01
   BFF2      .44390-01    BEHO      .48529-02    BEH2      .10469-03    BEH2O2    .30026-02  HFO       .16674-05
   BE2CL4    .15897-07    HF2O2     .19662-03    HF3O3     .24291-03    BEHO4     .88306-04  BE5O5     .33367-05
   BE6O6     .23615-06    CCL       .11200-08    CCLFO     .23637-09    CCLF3     .14608-17  CCL2O     .94869-10
   CCL3F     .75742-18    CCL4      .21569-18    CF        .73674-08    CF2       .15668-08  CF2       .37747-10
   CF2O      .17754-09    CF3       .19643-14    CF4       .82069-18    CH        .31011-07  CHCLF2    .20569-14
   CHCL2F    .18370-14    CHCL3     .10163-14    CHFO      .35048-07    CHF3      .98948-15  CHN       .26279-04
   CHNO      .43530-06    CHO       .23341-04    CH2       .18336-07    CH2CLF    .71700-12  CH2CL2    .98345-12
   CH2F2     .25524-12    CH2O      .13182-05    CH3       .15837-06    CH3CL     .34490-09  CH3F      .67572-10
   CH4       .36865-07    CN        .10136-05    C2F2      .25193-16    C2F4      .21301-23  C2H4      .44983-11
   C2H4O     .25131-15    C2N2      .57503-10    C3O2      .41461-11    CNF2      .47399-18  CL        .55665-02
   CLF       .44974-07    CLF03     .47909-25    CLF3      .43535-22    CLHO      .99812-06  CLNO      .73927-08
   CLO       .84982-06    CLO2      .27128-11    CL2O      .27719-11    F         .78547-04  FHO       .55668-08
   FN        .23708-04    FNO       .38823-09    FO        .14624-08    F2O       .90912-16  FXN       .26601-20
   H         .65694-01    HN        .20948-04    HO        .29339-02    H2N       .15136-04  H2O2      .22176-07
   H3N       .97000-05    HN2       .81142-12    N         .15777-04    NO        .25032-03  NO2       .39910-08
   N2O       .27127-07    N2O3      .19471-16    N2O4      .23865-22    N2O5      .81268-27  O         .35139-03
   O3        .62527-12    CCL2F2    .12848-17    CCLO      .26841-05    CFO       .65594-07  C2F6      .28885-31
   FNO2      .88244-15    CLNO2     .10023-13    F2N       .12418-13    FNO3      .17391-21  HNO       .38649-06
   BEN       .76398-05    HNO2      .72831-09    HNO3      .39992-14    BE2O      .70420-03  FNN2      .39641-34
   HO2       .53635-07    NO3       .99771-15    CH4O      .65570-24    CCL2      .23277-10  CCL3      .35788-14
   F2N2      .53440-14    H2N2      .68778-09    HF2F2O    .15761-01    CF2       .22592-09  C2O       .71994-08
   CLF5      .18459-38    HEH       .69606-14    FO2       .60519-12    C2H       .31929-08  C2N       .23183-09
   C2CL4     .12229-21    C2CL6     .10169-31    C2HF      .13129-11    C2CL2     .34554-13  C2HCL     .36300-10
   CHCL      .11694-08    CHF       .10842-08    C2F3O     .14422-20    F3NO      .11447-25  F2        .10373-10
   CL2       .21579-04    F2        .10720+00    O2        .13014-04    CHO       .58038-07  NF        .24375-09
   C2H3      .12922-10    C2H6      .99522-15    C3H       .92560-12    C3H2      .65852-13  C3H3      .10497-13
   C3H4      .43239-15    C3H5      .14499-14    C4H       .30223-15    C4H2      .43396-16  CLHNO*    .00000
   CLHNNO4*  .00000       BEH2O2*   .00000       HE*       .00000       BEO*      .18966+00  CHE2*     .00000
   BE3N2*    .00000       BECL2*    .00000       HFF2*     .00000
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Sample Problem 1 Output (Continued)

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        GRAPHITE SURFACE KINETICS (GASKET) PROB. 1          0000000+00

DERIVATIVE PROPERTY OUTPUT
 CP-FROZEN     CP-EQUIL    DLNM/DLNT    DLNM/DLNP      GAMMA
  .36603+00    .49852+02   -.43681+01    .49949-01    .99459+00

PROPERTY ROUTINE OUTPUT IN  LB-MASS,FT,SEC,BTU,AND DEG-R
   TEMP          VISC          COND          DBAR          PR            SC
  .90000+03    .16292-04     .15778-04     .17653-04    .80751+00     .72433+00
    MU1           MU2          MOL.WT          HTIL         CPTIL         HTIL*
  .77413+00    .20596+02     .25806+02    -.52830+03    .68840+00    -.13648+04

ELEMENTAL K AND Z MASS FRACTIONS BY ATOMIC NUMBER . . . . (GAMEX =  .667)
      1             4             6             7             8             9            17           106
   .33335-01     .12809+00     .11053+00     .11656+00     .30546+00     .14432+00     .14172+00     .00000
   .91019-01     .65809-01     .13771+00     .14548+00     .23385+00     .17956+00     .14659+00     .00000

SOLUTION TIMES
        ITERATIONS =    6                        TIME =      .414 SEC.

CLOSED SYSTEM EQUILIBRIUM SOLUTION OUTPUT

  MASS CONDENSED/MASS GAS =     .22523+00
  TEMP =    900.0000 DEG K.  =    500.0000 DEG K.      PRESS =      31.47837 ATM

                                    GAS            CONDENSED         COMPOSITE
  ENTHALPY - BTU/LBM             -.22911+04        -.10178+05        -.57409+04
  ENTROPY - BTU/LBM DEG R         .20345+01         .29797+00         .17153+01
  DENSITY - LBM/FT3               .10047+01                           .12359+01
  MOLECULAR WEIGHT               21.0621           25.0120           25.8059


 CHEMICAL STATE  (MOLE FR. = MOLECULES / TOTAL GAS PHASE MOLECULES).....

   SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.
   CO2     .27318-02     H2      .32262+00     H2O     .30269-01     C*      .00000     CLH     .41121-01
   FH      .26694-01     BE      .29748+02     CCLN    .36303-07     CO      .23469+00     C2H2    .88519-08
   C       .42832-07     C2      .12001-10     C3      .28174-13     C4      .51449-19     C5      .36000-22
   C2BE    .16436-09     HECL    .28718-02     HECLF   .37213-01     HECL2   .81673-02     HFF     .38901-01
   BEF2    .44390-01     BEHO    .46529+02     HFH2    .10869-03     HFH2O2  .30026-02     BEO     .16679-03
   BE2CL4  .15897-07     HF2O2   .19662+03     BE3O3   .24291-03     BE4O4   .88306-04     BE5O5   .33307-05
   BE6O6   .23615-06     CCL     .11200+00     CCLFO   .23637-09     CCLF3   .14808-17     CCL2O   .94859-10
   CCL3F   .75742-18     CCL4    .21569-18     CF      .73674+08     CFN     .15664-08     CF2     .37757-10
   CF2O    .17754-09     CF3     .14945-14     CF4     .42069-18     CH      .31811-07     CHCLF2  .20569-14
   CHCL2F  .18370-14     CHCL3   .10163-14     CHFO    .35448-07     CHF3    .94948-15     CHN     .26279-04
   CHNO    .43530-06     CHO     .23341-04     CH2     .18836-07     CH2CLF  .71700-12     CH2CL2  .98335-12
   CH2F2   .25524-12     CH2O    .13182+03     CH3     .15837-06     CH3CL   .54490-09     CH3F    .67572-10
   CH4     .36865-07     CN      .10136+05     C2F2    .25193-16     C2F4    .21301-23     C2H4    .44943-11
   C2H4O   .25131-15     C2N2    .57803-10     C3O2    .91461-11     C4N2    .47399-18     CL      .55665-02
   CLF     .44978-07     CLFO3   .47909+25     CLF3    .83535+22     CLHO    .99812-06     CLNO    .73997-08
   CLO     .84982-06     CLO2    .27129-11     CL2O    .27719-11     F       .78547-04     FHO     .55665-08
   FN      .23708-04     FNO     .58423-09     FO      .14624-04     F2O     .90912-16     F3N     .26601-20
   H       .65694-01     HF      .20444-04     HO      .29339+02     H2N     .15136-04     H2O2    .22176-07
   H3N     .97000-05     H4N2    .41142-12     N       .15777-04     NO      .25032-03     NO2     .39910-04
   N2O     .27127-07     N2O3    .14471-16     N2O4    .23865+22     N2O5    .81268-27     O       .35129-03
   O3      .62527-12     CCL2F2  .12844+17     CCLO    .26841-05     CFO     .65594-07     C2F6    .24885-31
   FNO2    .88244-15     CLNO2   .10025-13     F2N     .12418-13     FNO3    .17391-21     HNO     .38649-06
   BEN     .76398-05     HNO2    .72431-09     HNO3    .49992-14     BE2O    .70920-03     FNO2    .34641-34
   HO2     .53685-07     NO3     .99771-15     OF4O    .65870-24     CCL2    .23277-10     CCL3    .35738-14
   F2N2    .53440-14     H2N2    .88778-09     BE2F2O  .15761-01     CN2     .22592-09     C2O     .71995-08
   CLF5    .18459-38     BEH     .69606-16     FO2     .60519-12     C2H     .31929-08     C2N     .20159-09
   C2CL4   .12229-21     C2CL6   .10169-31     C2HF    .13129-11     C2CL2   .39454-13     C2HCL   .36300-10
   CHCL    .11634-08     CHF     .10942-08     C2F3N   .16822-20     F3NO    .11447-25     F2      .10375-10
   CL2     .21579-05     N2      .10720+00     O2      .13016-04     CNO     .58038-07     N3      .24375-09
   C2H3    .12922-10     C2H6    .99522-15     C3H     .92560-12     C3H2    .65852-13     C3H3    .10497-13
   C3H4    .43239-15     C3H5    .14499-14     C4H     .30223-15     C4H2    .43396-16     CLHN2*  .00000
   CLH4N04*  .00000      BEH2O2*   .00000      BF*     .00000        BEO*    .14966+00     CBE2*   .00000
   BE3N2*    .00000      BECL2*    .00000      BEF2*   .00000
```

Sample Problem 1 Output (Continued)

```
        GRAPHITE SURFACE KINETICS (GASKET) PROB. 1          0003000+00

         CP-FROZEN=   .36624+00

PROPERTY ROUTINE OUTPUT IN  LB-MASS,FT,SEC,BTU,AND DEG-R
   TEMP          VISC          COND          DBAR          PR            SC
 .90000+03     .16355-04     .99522+05     .17653-04     .60185+00     .72464+00
   MU1           MU2          MOL.WT         HTIL          CPTIL         HTIL*
 .94288+00     .25172+02     .26508+02    -.36450+04     .43371+00    -.37859+04

ELEMENTAL K AND Z MASS FRACTIONS BY ATOMIC NUMBER . . . . (GAMEX =  .667)
     1             4             6             7             8             9            17           106
  .71313-01     .87637-01     .11139+00     .13714+00     .22999+00     .20646+00     .15608+00     .00000
  .91019-01     .65809-01     .13771+00     .14546+00     .23385+00     .17956+00     .14659+00     .00000

SOLUTION TIMES
        ITERATIONS =   34                        TIME =    9.753 SEC.

OPEN SYSTEM CHEMICAL KINETICS SOLUTION OUTPUT

 SURFACE IS ATJ GRAPHITE
 MASS TRANSFER COEFFICIENT ROUCM =     .96900+00
 RHO V WALL/RHOE UE CM =     .10000-16   BPRIME =     .00000

 STATE ADJACENT TO THE SURFACE . . . .
  TEMP =   900.0000 DEG R =   500.0000 DEG K      PRESS =     31.47837 ATM

                                  GAS          CONDENSED        COMPOSITE
  ENTHALPY - BTU/LBM           -.41003+04        .00000          -.41003+04
  ENTROPY - BTU/LBM DEG R       .10084+01        .00000           .00000
  DENSITY - LBM/FT3             .12695+01                         .12695+01
  MOLECULAR WEIGHT             26.5080           .0000           26.5080


 CHEMICAL STATE ADJACENT TO THE SURFACE
  (MOLE FR FOR GASES = MOLECULES / TOTAL GAS MOLECULES )
  (MOLE FR FOR CONDENSED = BPRIME CONDENSED ). . . .

   SPECIES   MOLE FR.     SPECIES   MOLE FR.     SPECIES   MOLE FR.     SPECIES   MOLE FR.     SPECIES   MOLE FR.
   CO2       .23277-07    H2        .56640-01    H2O       .26939+00    C*        .00000     CLH       .11182+00
   FH        .27636-03    BE        .00000     CCLN      .75120-27    CO        .34549-10    C2H2      .12934-27
   C         .00000     C2        .00000     C3        .00000     C4        .00000     C5        .00000
   C2BE      .00000     BECL      .15712-33    HECLF     .43118-02    BECL2     .28301-03    HEF       .72840-27
   HEF2      .14155+00    BEHO      .24712-31    HEH2      .97115-54    HEH2O2    .10283-03    BEO       .00000
   BE2CL4    .10721-08    BE2O2     .00000     BE3O3     .63335-25    BF4O4     .92324-17    BE5O5     .21536-10
   BE6O6     .18516-01    CCL       .00000     CCLFO     .67349-25    CCLF3     .00000     CCL2O     .23793-25
   CCL3F     .00000     CCL4      .00000     CF        .00000     CFN       .15286-37    CF2       .00000
   CF2O      .18157-24    CF3       .00000     CF4       .00000     CH        .00000     CHCLF2    .45249-31
   CHCL2F    .22641-30    CHCL3     .27769-28    CHFO      .15828-19    CHF3      .18261-30    CHN       .38271-16
   CHNO      .44396-17    CHO       .32711-28    CH2       .00000     CH2CLF    .63060-22    CH2CL2    .31835-18
   CH2F2     .64381-24    CH2O      .30839-15    CH3       .14482-19    CH3CL     .76154-09    CH3F      .89693-15
   CH4       .24583+00    CN        .00000     C2F2      .00000     C2F4      .00000     C2H4      .32929-15
   C2H4O     .13713-30    C2N2      .64819-37    C3O2      .00000     C4N2      .00000     CL        .92420-21
   CLF       .21185-36    CLFO3     .00000     CLF3      .00000     CLHO      .10896-25    CLNO      .00000
   CLO       .00000     CLO2      .00000     CL2O      .00000     F         .18740-37    FHO       .00000
   FN        .00000     FNO       .00000     FO        .00000     F2O       .00000     F3N       .00000
   H         .29398-21    HN        .34121-35    HO        .12669-26    H2N       .58404-20    H2O2      .13994-36
   H3N       .42508-01    H4N2      .15408-21    N         .00000     NO        .60951-32    NO2       .00000
   N2O       .23507-35    N2O3      .00000     N2O4      .00000     N2O5      .00000     O         .00000
   O3        .00000     CCL2F2    .00000     CCLO      .36905-27    CFO       .17026-37    C2F6      .00000
   FNO2      .00000     CLNO2     .00000     F2N       .00000     FNO3      .00000     HNO       .98344-36
   BEN       .00000     HNO2      .00000     HNO3      .00000     BE2O      .00000     F4N2      .00000
   HO2       .00000     NO3       .00000     CF4O      .00000     CCL2      .00000     CCL3      .00000
   F2N2      .00000     H2N2      .31209-28    BE2F2O    .17438-03    CN2       .00000     C2O       .00000
   CLF5      .00000     BEH       .00000     FO2       .00000     C2H       .00000     C2N       .00000
   C2CL4     .00000     C2CL6     .00000     C2HF      .00000     C2CL2     .00000     C2HCL     .24639-36
   CHCL      .00000     CHF       .00000     C2F3N     .00000     F3NO      .00000     F2        .00000
   CL2       .11230-20    N2        .10851+00    O2        .00000     CNO       .00000     N3        .00000
   C2H3      .86439-35    C2H6      .20206-06    C3H       .00000     C3N2      .00000     C3H3      .00000
   C3H4      .73722-31    C3H5      .28923-26    C4H       .00000     C4N2      .00000
```

Sample Problem 1 Output (Continued)

```
        GRAPHITE SURFACE KINETICS (GASKET' PROB. 1          5002000+00

                                                                                6  6

         CP-FROZEN=   .41587+00

PROPERTY ROUTINE OUTPUT IN  LB-MASS,FT,SEC,BTU,AND DEG-R
   TEMP        VISC        COND        DBAR        PR          SC
 .25200+04   .32185-04   .33969-04   .47419-04   .39403+00   .72449+00
   MU1         MU2        MOL.WT       HTIL        CPTIL       HTIL*
 .80934+00   .21579+02   .23272+02  -.12491+04   .75158+00  -.17734+04

ELEMENTAL K AND Z MASS FRACTIONS BY ATOMIC NUMBER . . . . (GAMMA =  .667)
     1           4           6           7           8           9          17         106
  .39722-01   .81106-01   .13133+00   .13745+00   .23048+00   .20804+00   .17147+00   .00000
  .90963-01   .65695-01   .13893+00   .14526+00   .23353+00   .17927+00   .14635+00   .00000

SOLUTION TIMES
        ITERATIONS =    8                       TIME =    3.121 SEC.

OPEN SYSTEM CHEMICAL KINETICS SOLUTION OUTPUT

 SURFACE IS ATJ GRAPHITE
 MASS TRANSFER COEFFICIENT RHOCM =     .96900+00
 RHO V WALL/RHOE UE CM =     .14042-02   BPRIME =     .14042-02

 STATE ADJACENT TO THE SURFACE . . . .
  TEMP =  2420.0000 DEG R =  1400.0000 DEG K      PRESS =     31.47837 ATM

                              GAS            CONDENSED        COMPOSITE
  ENTHALPY - BTU/LBM        -.24808+04         .00000          -.24808+04
  ENTROPY - BTU/LBM DEG R    .22753+01         .00000           .00000
  DENSITY - LBM/FT3          .39804+00                          .39804+00
  MOLECULAR WEIGHT          23.2721             .0000          23.2721


 NET FORWARD RATE OF KINETICALLY CONTROLLED REACTIONS
  (MOLES OF REACTION / UNIT SURFACE AREA / TIME / RHOE UE CM). . . .
  1=   .49822-04  2=   .67044+04  3=   .12046-11  4=   .24574-19  5=   .11522-21
  6=   .30147-21  7=   .27480-26  8=   .26413-28

RATIO OF FORWARD TO REVERSE KINETICALLY CONTROLLED PRODUCTION RATES
  1=   .2743E+01  2=   .2743E+01  3=   .75284+01  4=   .27438+01  5=   .75284+01
  6=   .20656+02  7=   .20492+02  8=   .19474+00

 CHEMICAL STATE ADJACENT TO THE SURFACE
  (MOLE FR FOR GASES = MOLECULES / TOTAL GAS MOLECULES )
  (MOLE FR FOR CONDENSED = BPRIME CONDENSED ). . . .

   SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.
   CO2       .85921-02     H2        .38465+00     H2O       .30121-01     C+        .00000        CLH       .33108-01
   FH        .39627-02     BE        .46678-13     CCLN      .17192-09     CC        .23852+00     C2H2      .15142-06
   C         .36925-20     C2        .31321-23     C3        .72505-32     CN        .24869-28     C5        .13041-28
   C2BE      .31909-19     HECL      .37022-09     BECLF     .47444-01     BECL2     .12932-01     BEF       .75349-07
   BEF2      .79827-01     BEHO      .15065-08     BEH2      .66046-10     BEH2O     .22544-02     BEO       .17680-15
   BE2CL4    .67036-07     BE2O2     .18076-12     BE3O3     .47439-07     BE4O4     .80484-05     BE5O5     .57045-04
   BE6O6     .38201-02     CCL       .48858-19     CCLFO     .95752-12     CCLF3     .27107-22     CCL2O     .60635-12
   CCL3F     .29804-22     CCL4      .23116-32     CF        .15439-17     CFN       .22236-13     CF2       .46485-17
   CF2O      .61283-12     CF3       .31722-22     CF4       .25851-32     CH        .15714-17     CHCLF2    .61564-17
   CHCL2F    .14021-16     CHCL3     .49252-16     CHFO      .24971-18     CH2       .32085-17     CHN       .37684-04
   CHNO      .25429-06     CHO       .93430-08     CH2       .73062-13     CH2CLF    .52468-12     CH2CL2    .92032-11
   CH2F2     .47337-13     CH2O      .25500-05     CH3       .24142-06     CH3CL     .52715-06     CH3F      .31217-08
   CH4       .73102-02     CN        .25181-12     C2H2      .62048-35     C2F4      .44047-31     C2H4      .13585-05
   C2H4O     .23851-13     C2N2      .78567-11     C3O2      .60515-11     C4N2      .67288-18     CL        .45568-07
   CLF       .28493-19     CLF03     .00000        CLF3      .00000        CLHO      .17927-11     CLNO      .40521-17
   CLO       .43769-16     CLO2      .16255-27     CL2O      .15794-23     F         .77122-13     FHO       .95053-18
   FN        .38856-21     FNO       .14565-20     FO        .61591-34     F2O       .21925-36     F3N       .00000
   H         .53855-06     HN        .52452-12     HO        .80142-09     H2F       .43551-08     H2O2      .11415-15
   H3N       .22196-03     HNN2      .69154-14     F         .23540-15     NO        .40605-11     NO2       .22003-20
   N2O       .48229-15     N2O3      .56012-36     N2O4      .00000        N2O5      .00000        O         .10360-14
   O3        .16403-32     CCL2F2    .22206-22     CCLO      .11786-08     CFO       .11261-12     C2F6      .64051-38
   FNO2      .38048-31     CLNO2     .61906-28     F2N       .72593-29     FNO3      .00000        HNO       .49163-14
   BEN       .81119-18     HNO2      .12122-14     HNO3      .15696-28     HE2O      .59119-14     F4N2      .00000
   HO2       .76148-19     NO3       .76539-34     CF4O      .44086-48     CCL2      .33734-17     CCL4      .11915-19
   F2N2      .26483-34     H2N2      .20228-13     HF2F2O    .21678-01     CN2       .46774-17     C2O       .69201-14
   CLF3      .00000        HFN       .00000        FO2       .62481-41     C2F       .13959-12     C2N       .80212-16
   C2CL4     .20215-24     C2CL6     .93260-37     C2HF      .26451-15     C2CL2     .24070-16     C2HCL     .57193-11
   CHCL      .25239-15     CHF       .27089-15     C2F3N     .52410-25     F3CL      .00000        F2        .54039-25
   CL2       .77717-10     N2        .11405+00     O2        .33436-16     CNO       .29666-13     H3        .66695-19
   C2H3      .30471-10     C2H6      .75934-06     C3H       .27705-14     C3H2      .13257-13     C3H3      .26247-11
   C3H4      .14686-09     C3H5      .57612-08     C4H       .20537-17     C4H2      .35932-14
```

Sample Problem 1 Output (Concluded)

```
          GRAPHITE SURFACE KINETICS (GASKET) PROB. 1          5002000*40
                                                                                   6  6
           CP-FROZEN=   .52269+00

 PROPERTY ROUTINE OUTPUT IN  LB-MASS,FT,SEC,BTU,AND DEG-R
    TEMP        VISC        COND        DBAR        PR          SC
  .72000+04   .64280-04   .66452-04   .55595-03   .50561+00   .72353+00
     MU1         MU2       MOL.WT       HTIL       CPTIL       HTIL*
  .87984+00   .23487+02   .24810+02   .84810+04   .73985+00   .69927+04

 ELEMENTAL K AND Z MASS FRACTIONS BY ATOMIC NUMBER . . . . (GAMEX =  .667)
      1           4           6           7           8           9          17         106
  .34442-01   .34894-01   .55762+00   .75109-01   .12072+00   .95579-01   .81641-01   .00000
  .59850-01   .34231-01   .53805+00   .77487-01   .12461+00   .93065-01   .72708-01   .00000

 SOLUTION TIMES
        ITERATIONS =    6                        TIME =    2.693 SEC.

 OPEN SYSTEM CHEMICAL KINETICS SOLUTION OUTPUT

  SURFACE IS ATJ GRAPHITE
  MASS TRANSFER COEFFICIENT ROUCM =     .96900+00
  RHO V WALL/RHOE UE CM =     .90496+00   BPRIME =    .90496+00

  STATE ADJACENT TO THE SURFACE . . . .
   TEMP =  7199.9999 DEG R =  4000.0000 DEG K      PRESS =     31.47837 ATM

                                  GAS          CONDENSED       COMPOSITE
   ENTHALPY - BTU/LBM           .55476+04       .00000          .55476+04
   ENTROPY - BTU/LBM DEG R      .29015+01       .00000          .00000
   DENSITY - LBM/FT3            .14852+00                       .14852+00
   MOLECULAR WEIGHT             24.8099          .0000          24.8099

  NET FORWARD RATE OF KINETICALLY CONTROLLED REACTIONS
   (MOLES OF REACTION / UNIT SURFACE AREA / TIME / RHOE UE CM). . . .
   1=   .68928-08  2=   .50169-08  3=   .31663-01  4=   .10209-02  5=   .36008-02
   6=   .10735-02  7=   .14060-03  8=   .24100-05

 RATIO OF FORWARD TO REVERSE KINETICALLY CONTROLLED PRODUCTION RATES
  1=   .12717+01  2=   .12717+01  3=   .16173+01  4=   .12717+01  5=   .16173+01
  6=   .20568+01  7=   .26157+01  8=   .33264+01

  CHEMICAL STATE ADJACENT TO THE SURFACE
   (MOLE FR FOR GASES = MOLECULES / TOTAL GAS MOLECULES )
   (MOLE FR FOR CONDENSED = BPRIME CONDENSED ). . . .
```

SPECIES	MOLE FR.	SPECIES	MOLE FR.	SPECIES	MOLE FR.	SPECIES	MOLE FR.	SPECIES	MOLE FR.
C02	.40920-06	H2	.14220+00	H20	.26537-05	C*	.00000	CLH	.23855-01
FH	.23877-01	BE	.68860-02	CCLN	.11922-03	CO	.18708+00	C2H2	.57107-01
C	.16639-02	C2	.17498-02	C3	.81174-02	C4	.74222-04	C5	.13359-03
C2BE	.52947-02	BECL	.29082-02	BECLF	.13700-01	BECL2	.21961-02	BEF	.43473-01
BEF2	.21536-01	BEHO	.69443-06	BEH2	.50970-04	BEH202	.20260-10	BEO	.91535-07
BE2CL4	.11603-08	BE202	.47866-11	BE303	.17855-15	BE404	.31693-20	BE505	.60325-26
BE606	.19430-31	CCL	.23411-04	CCLFO	.30149-09	CCLF3	.20419-17	CCL20	.86599-10
CCL3F	.54822-14	CCL4	.10582-14	CF	.18453-03	CFN	.10499-04	CF2	.69644-06
CF20	.30941-09	CF3	.37664-10	CF4	.14679-13	CH	.50956-03	CHCLF2	.11000-10
CHCL2F	.67811-11	CHCL3	.24204-11	CHFO	.28027-07	CHF3	.70992-11	CHN	.42659-01
CHNO	.14881-06	CHO	.22482-04	CH2	.86656-04	CH2CLF	.14420-08	CH2CL2	.12115-08
CH2F2	.76768-09	CH20	.46237-06	CH3	.19086-03	CH3CL	.22271-06	CH3F	.76452-07
CH4	.12706-04	CN	.77934-02	C2F2	.26741-08	C2F4	.27694-15	C2H4	.63300-05
C2H40	.13140-12	C2N2	.41630-03	C302	.27134-07	C4N2	.51145-04	CL	.11698-01
CLF	.18686-06	CLF03	.37722-34	CLF3	.39304-20	CLHO	.30383-09	CLNO	.37919-11
CLO	.84935-09	CL02	.14854-17	CL20	.33655-14	F	.43831-03	FHO	.45589-11
FN	.14854-07	FNO	.37965-12	FO	.47387-11	F20	.84732-18	F3N	.64774-19
H	.10666+00	HN	.30643-04	HO	.11835-05	H2N	.73868-05	H202	.16364-14
H3N	.14042-05	H4N2	.89043-13	N	.60870-04	NO	.11125-06	NO2	.75604-15
N20	.73472-11	N203	.11633-26	N204	.84252-36	N205	.00000	O	.50559-06
03	.16508-21	CCL2F2	.13176-13	CCLO	.33296-05	CFO	.16610-06	C2F6	.46427-23
FNO2	.41029-21	CLNO2	.23826-20	F2N	.14381-12	FNO3	.73199-31	HNO	.11725-09
BEN	.15098-04	HNO2	.61988-16	HNO3	.15359-24	BE20	.12312-06	F4N2	.37019-32
HO2	.10567-13	NO3	.12518-24	CF40	.12314-22	CCL2	.24126-06	CCL3	.25261-10
F2N2	.44303-17	H2N2	.31978-09	BE2F20	.57605-06	CN2	.12552-05	C20	.69242-04
CLF5	.11706-35	BEH	.25768-14	F02	.71634-18	C2H	.78099-01	C2N	.61562-02
C2CL4	.20610-14	C2CL6	.20347-24	C2HF	.33483-04	C2CL2	.77916-06	C2HCL	.42365-03
CHCL	.88925-05	CHF	.10999-04	C2F3N	.61728-13	F3NO	.13937-27	F2	.16659-09
CL2	.34953-05	N2	.37622-01	02	.36642-11	CNO	.83820-07	N3	.27300-09
C2H3	.63328-04	C2H6	.37495-09	C3H	.68632-01	C3H2	.25206-02	C3H3	.15310-03
C3H4	.25480-05	C3H5	.48873-05	C4H	.88971-01	C4H2	.43112-02		

Sample Problem 2

The shockwave option of GASKET is utilized in this problem. The surface material is made of 15% SiC/PG. The boundary layer edge state is specified as the stagnation condition behind a normal shock wave with an upstream Mach number of two. The shock is assumed to exist in the divergent section of a nozzle and, thus, conditions upstream of the shock are calculated via an isentropic expansion from input ideal chamber conditions. Since the edge gases contain both hydrogen and oxygen, all three kinetically-controlled surface reactions are possible. Two temperatures are input for both the frozen edge and surface temperature arrays. Finally, the diffusion factors are updated for 16 selected species.

Listing of Input

```
 1.  5098220400  3901.      40.81      -2.0       68.02      0.463      0.0          PROP. 2
 2.   .15
 3.    1000.
 4.    1500.
 5.
 6.    1200.
 7.    1400.
 8.
 9.    6
10.    1 HYDROGEN    1.008       3.2219
11.    6 CARBON      12.011       .56490              1.0
12.    7 NITROGEN    14.008       .5366
13.    8 OXYGEN      16.0        2.2486
14.   13 ALUMINUM    26.98       1.013
15.   17 CHLORINE    35.453       .5398
16.  1            0.0         -9999.                0.0
17.   16
18.  C              0.69180CH             0.74920CH4            0.93570CN             1.02670
19.  CO             1.01700CO2            1.29140C2H2           1.17460H              0.30180
20.  H2             0.38930H2O            0.77490N              0.74930NO             0.99810
21.  N2             1.026200              0.7397002             1.0000OC2             1.02530
22.  8
```

Sample Problem 2 Output

```
        GRAPHITE SURFACE KINETICS (GASKET)    PROB. 2     0110000*J0

RELATIVE ELEMENTAL COMPOSITIONS, ATOMIC WTS/UNIT MASS
     AT.NO.    ELEMENT     ATOMIC WT      EDGE GAS       SURFACE
        1      HYDROGEN      1.00800      .0322205      .0000000
        6      CARBON       12.01100      .0056493      .0000000
        7      NITROGEN     14.00800      .0053663      .0000000
        8      OXYGEN       16.00000      .0224871      .0000000
       13      ALUMIMUN     26.98000      .0101305      .0000000
       17      CHLORINE     35.45300      .0053983      .0000000
       14      SILICON      28.09000      .0000000      .0037407
      106      GRAPHITE     12.01100      .0000000      .0745088

   ELEMENTS          HYDROGEN     CARBON       NITROGEN     OXYGEN       ALUMIMUN
                     CHLORINE     SILICON      GRAPHITE

   BASE SPECIES      H2           CO2          ALN          H2O          AL
                     CLH          CH3CL3S      C*
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Sample Problem 2 Output (Continued)

```
                GRAPHITE SURFACE KINETICS (GASKET) SOLUTION          PROB. 2


DERIVATIVE PROPERTY OUTPUT
 CP-FROZEN     CP-EQUIL    DLNM/DLNT    DLNM/DLNP      GAMMA
  .42289+00     .12704+01   -.81279+00    .49323-01    .11173+01

PROPERTY ROUTINE OUTPUT IN  LB-MASS,FT,SEC,BTU,AND DEG-R
   TEMP          VISC          COND          DBAR           PR            SC
  .70218+04     .62950-04     .84839-04     .24681-03     .20753+00     .72419+00
    MU1           MU2          MOL.WT         HTIL          CPTIL         HTIL*
  .73200+00     .19437+02     .33303+02     .65193+04     .96142+00     .43301+04

ELEMENTAL K AND Z MASS FRACTIONS BY ATOMIC NUMBER . . . . (GAMEX =  .667)
      1             6             7             8            13            17            14           106
   .32478-01     .67853-01     .75170-01     .35979+00     .27332+00     .19138+00     .00000        .00000
   .11322+00     .11673+00     .12994+00     .28974+00     .66727-01     .20364+00     .00000        .00000

SOLUTION TIMES
        ITERATIONS =   27                        TIME =     5.727 SEC.

CLOSED SYSTEM EQUILIBRIUM SOLUTION OUTPUT

  MASS CONDENSED/MASS GAS =     .72922+00
  TEMP =  7021.8000 DEG R.  =  3901.0000 DEG K.      PRESS =     68.02000 ATM

                                GAS            CONDENSED        COMPOSITE
  ENTHALPY - BTU/LBM            .19521+04      -.45284+04        -.78073+03
  ENTROPY - BTU/LBM DEG R       .29114+01       .98044+00         .20971+01
  DENSITY - LBM/FT3             .25544+00                         .44172+00
  MOLECULAR WEIGHT             19.2588        101.9600           33.3027


 CHEMICAL STATE  (MOLE FR. = MOLECULES / TOTAL GAS PHASE MOLECULES).....

    SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.
    CO2       .66796-02     H2        .32612+00     H2O       .10142+00     C*        .00000        CLH       .10317+00
    AL        .34049-02     ALN       .62793-06     CH3CL3S   .00000        CO        .14134+00     C2H2      .21043-08
    C         .61816-07     C2        .82773-11     C3        .55550-14     C4        .61005-20     C5        .15053-23
    CAL       .15823-08     ALCL      .30440-01     ALCLO     .57887-02     ALCL2     .10091-01     ALCL3     .16845-03
    ALH       .47985-03     ALHO2     .26119-02     ALO       .22265-02     AL2CL6    .23514-10     AL2O      .14059-02
    AL2O2     .13163-04     CCL       .40185-08     CCLN      .59882-07     CCL2O     .13643-08     CCL4      .16440-16
    CH        .46292-07     CHCL3     .21843-13     CHN       .12377-04     CHNO      .71144-06     CHO       .43111-04
    CH2       .20564-07     CH2CL2    .62569-11     CH2O      .22209-05     CH3       .12179-06     CH3CL     .65644-09
    CH4       .21298-07     CN        .81008-06     C2H4      .13280-11     C2H4O     .40575-15     C2N2      .14714-10
    C3O2      .67075-11     C4H2SI    .00000        C4N2      .28948-19     CL        .19095-01     CLHO      .18083-04
    CLH3SI    .00000        CLNO      .20144-06     CLO       .19467-04     CLO2      .46459-09     CLSI      .00000
    CL2H2SI   .00000        CL2O      .30342-09     CL2SI     .00000        CL3HSI    .00000        CL4SI     .00000
    H         .92093-01     HN        .54934-04     HO        .16302-01     HSI       .00000        H2N       .33583-04
    H2O2      .78294-06     H3N       .16734-04     H4N2      .46761-11     H4SI      .00000        H         .43874-04
    NO        .14889-02     NO2       .14505-06     NSI       .00000        N2O       .22032-06     N2O3      .65238-14
    N2O4      .67070-19     N2O5      .16945-22     O         .26379-02     OSI       .00000        O2SI      .00000
    O3        .17671-09     SI        .00000        SI2       .00000        SI3       .00000        CCLO      .12090-04
    CLNO2     .17850-11     HNO       .34743-05     HNO2      .28577-07     HNO3      .10030-11     ALHO      .30328-02
    HO2       .20316-05     NO3       .31540-12     CCL2      .19426-09     CCL3      .89640-13     H2N2      .31562-08
    CN2       .28294-09     C2O       .67827-08     C2H       .10781-08     CSI       .00000        CSI2      .00000
    C2N       .80606-10     C2SI      .00000        NSI2      .00000        C2CL4     .41566-20     C2CL6     .66177-29
    ALO2      .30844-03     C2CL2     .68909-13     C2HCL     .27460-10     CHCL      .38211-08     CL3SI     .00000
    CL2       .24563-04     N2        .88527-01     O2        .32099-03     CNO       .14687-06     N3        .10382-08
    C2H3      .50618-11     C2H6      .42456-15     C3H       .12592-12     C3H2      .10796-13     C3H3      .16301-14
    C3H4      .66570-16     C3H5      .29253-15     C4H       .20527-16     C4H2      .28295-17     ALCLO*    .00000
    CSI*      .00000        CLH4N*    .00000        CLH4I.04* .00000        ALCL3*    .00000        ALN*      .00000
    AL2O5SI*  .00000        C3AL4*    .00000        H4SI3*    .00000        AL*       .00000        AL2O3*    .13774+00
    O2SI*     .00000        SI*       .00000        AL6O13S*  .00000
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Sample Problem 2 Output (Continued)

```
        GRAPHITE SURFACE KINETICS (GASKET)    PROB. 2     2000200+00

DERIVATIVE PROPERTY OUTPUT
 CP-FROZEN     CP-EQUIL    DLNM/DLNT    DLNM/DLNP      GAMMA
 .42237+00     .13866+01   -.90234+00    .53735-01     .11154+01

PROPERTY ROUTINE OUTPUT IN  LB-MASS,FT,SEC,BTU,AND DEG-R
   TEMP          VISC          COND          DBAR          PR            SC
 .68843+04     .62125-04     .83769-04     .39809-03     .20738+00     .72416+00
   MU1           MU2          MOL.WT         HTIL          CPTIL         HTIL*
 .72854+00     .19343+02     .32992+02     .66964+04     .96181+00     .44251+04

ELEMENTAL K AND Z MASS FRACTIONS BY ATOMIC NUMBER . . . . (GAMFX =  .667)
     1             6             7             8             13            17            14            106
  .32478-01     .67853-01     .75171-01     .35979+00     .27332+00     .19138+00     .00000        .00000
  .11334+00     .11629+00     .12945+00     .28969+00     .67757-01     .28347+00     .00000        .00000

SOLUTION TIMES
        ITERATIONS =    4                          TIME =     1.144 SEC.

CLOSED SYSTEM EQUILIBRIUM SOLUTION OUTPUT

  MASS CONDENSED/MASS GAS =     .72521+00
  TEMP =  6884.3399 DEG R.  =  3824.6333 DEG K.      PRESS =      40.81000 ATM

                                GAS              CONDENSED         COMPOSITE
  ENTHALPY - BTU/LBM            .19709+04        -.45750+04         -.78073+03
  ENTROPY - BTU/LBM DEG R       .29646+01         .97375+00          .21277+01
  DENSITY - LBM/FT3             .15522+00                            .26779+00
  MOLECULAR WEIGHT              19.1235          101.9600           32.9921


 CHEMICAL STATE  (MOLE FR. = MOLECULES / TOTAL GAS PHASE MOLECULES).....

    SPECIES   MOLE FR.     SPECIES   MOLE FR.     SPECIES   MOLE FR.     SPECIES   MOLE FR.     SPECIES   MOLE FR.
    CO2       .66546-02    H2        .31914+00    H2O       .98956-01    C*        .00000       CLH       .10119+00
    AL        .38011-02    ALN       .50642-06    CH3CL3S   .00000       CO        .17968+00    C2H2      .74198-09
    C         .42776-07    C2        .34498-11    C3        .15450-14    C4        .97545-21    C5        .15391-24
    CAL       .91928-09    ALCL      .31656-01    ALCL0     .60040-02    ALCL2     .87705-02    ALCL3     .12595-03
    ALH       .42854-03    ALHO2     .26300-02    ALO       .24446-02    AL2CL6    .79259-11    AL20      .14687-02
    AL2O2     .13715-04    CCL       .23072-08    CCLN      .32720-07    CCL20     .74694-09    CCL4      .50571-17
    CH        .26478-07    CHCL3     .71824-14    CHN       .72273-05    CHNO      .41045-06    CHO       .29745-04
    CH2       .10254-07    CH2CL2    .21824-11    CH2O      .12917-05    CH3       .54189-07    CH3CL     .24258-09
    CH4       .83002-08    CN        .51440-06    C2H4      .30748-12    C2H4O     .84772-16    C2N2      .49727-11
    C3O2      .22951-11    C4H2SI    .00000       C4N2      .35153-20    CL        .21254-01    CLHO      .15154-04
    CLH3SI    .00000       CLNO      .15342-06    CLO       .18806-04    CLO2      .38063-09    CLSI      .00000
    CL2H2SI   .00000       CL2O      .21340-09    CL2SI     .00000       CL3HSI    .00000       CL4SI     .00000
    H         .10200+00    HN        .43880-04    HO        .17379-01    HSI       .00000       H2N       .22965-04
    H2O2      .60506-06    H3N       .99507-05    H4N2      .14790-11    H4SI      .00000       N         .41830-04
    NO        .15441-02    NO2       .13285-06    NSI       .00000       N2O       .17530-06    N2O3      .37517-14
    N2O4      .33807-19    N2O5      .72599-23    O         .31989-02    OSI       .00000       O2SI      .00000
    O3        .16647-09    SI        .00000       SI2       .00000       SI3       .00000       CCLO      .83900-05
    CLNO2     .11848-11    HNO       .27447-05    HNO2      .21334-07    HNO3      .65512-12    ALHO      .30319-02
    HO2       .18717-05    NO3       .23774-12    CCL2      .93704-10    CCL3      .34541-13    H2N2      .16050-08
    CN2       .13420-09    C2O       .33590-08    C2H       .42842-09    CSI       .00000       CSI2      .00000
    C2N       .30556-10    C2SI      .00000       NSI2      .00000       C2CL4     .77890-21    C2CL6     .68134-30
    ALO2      .34069-03    C2CL2     .28166-13    C2HCL     .92944-11    CHCL      .18481-08    CL3SI     .00000
    CL2       .21420-04    N2        .87684+01    O2        .38878-03    CNO       .93847-07    N3        .60618-09
    C2H3      .13389-11    C2H6      .63183-16    C3H       .31154-13    C3H2      .21307-14    C3H3      .26940-15
    C3H4      .91207-17    C3H5      .31438-16    C4H       .30331-17    C4H2      .31891-18    ALCLO*    .00000
    CSI*      .00000       CLH4N*    .00000       CLH4NO4*  .00000       ALCL3*    .00000       ALN*      .00000
    AL2O5SI*  .00000       C3AL4*    .00000       N4SI3*    .00000       AL*       .00000       AL2O3*    .13692+00
    O2SI*     .00000       SI*       .00000       AL6O13S*  .00000
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Sample Problem 2 Output (Continued)

```
        GRAPHITE SURFACE KINETICS (GASKET)    PROB. 2     3000100+00

DERIVATIVE PROPERTY OUTPUT
 CP-FROZEN     CP-EQUIL    DLNM/DLNT    DLNM/DLNP      GAMMA
  .42267+00    .11508+01   -.62810+00    .33430-01    .11111+01

PROPERTY ROUTINE OUTPUT IN  LB-MASS,FT,SEC,BTU,AND DEG-R
    TEMP         VISC         COND          DBAR           PR           SC
  .58395+04    .55713-04    .77229-04    .22498-02    .19013+00    .72459+00
     MU1          MU2        MOL.WT         HTIL         CPTIL        HTIL*
  .71314+00    .18914+02    .34303+02    .54259+04    .98836+00    .35344+04

ELEMENTAL K AND Z MASS FRACTIONS BY ATOMIC NUMBER . . . . (GAMEX =  .667)
       1            6            7            8           13           17           14          106
   .32478-01    .67853-01    .75170-01    .35979+00    .27332+00    .19138+00    .00000       .00000
   .12227+00    .12477+00    .13877+00    .26677+00    .35429-01    .31199+00    .00000       .00000

SOLUTION TIMES
        ITERATIONS =    8                          TIME =    2.154 SEC.

CLOSED SYSTEM EQUILIBRIUM SOLUTION OUTPUT

  MASS CONDENSED/MASS GAS =     .8816+00
  TEMP =  5839.4862 DEG R.  =  3244.1602 DEG K.      PRESS =      5.49553 ATM

                                  GAS            CONDENSED        COMPOSITE
  ENTHALPY - BTU/LBM            .14629+04        -.4929+04         -.15324+04
  ENTROPY - BTU/LBM DEG R       .31944+01         .91785+00         .21277+01
  DENSITY - LBM/FT3             .23492-01                           .44203-01
  MOLECULAR WEIGHT              18.2305           101.9600          34.3033

 ABOVE ARE STATIC PROPERTIES                 H-KINETIC =    .75168+03 BTU/LBM
  VEL. =      .6134+04 FT/SEC    FLUX =     .27115+03 LBM/FT2SEC    MACH =   2.00009

 CHEMICAL STATE  (MOLE FR. = MOLECULES / TOTAL GAS PHASE MOLECULES).....

   SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.
   CO2       .57216-02     H2        .35846+00     H2O       .83429-01     C*        .00000        CLH       .13076+00
   AL        .10239-02     ALN       .28250-07     CH3CL3S   .00000        CO        .18806+00     C2H2      .34405-10
   C         .22047-08     C2        .56849-13     C3        .86103-17     C4        .75224-24     C5        .42889-28
   CAL       .13454-10     ALCL      .19183-01     ALCLO     .31966-02     ALCL2     .59746-02     ALCL3     .91144-04
   ALH       .66549-04     ALHO2     .73142-03     ALO       .43774-03     AL2CL6    .87246-12     AL2O      .22585-03
   AL2O2     .16610-05     CCL       .10738-09     CCLN      .59864-08     CCL2O     .87612-10     CCL4      .97907-19
   CH        .10625-08     CHCL3     .23164-15     CHN       .14237-05     CHNO      .55778-07     CHO       .50789-05
   CH2       .52156-09     CH2CL2    .10489-12     CH2O      .20662-06     CH3       .45080-08     CH3CL     .17694-10
   CH4       .87956-09     CN        .49273-07     C2H4      .60120-14     C2H4O     .50464-18     C2N2      .12991-12
   C3O2      .52146-13     C4H2SI    .00000        C4N2      .36796-23     CL        .19762-01     CLHO      .35802-05
   CLH3SI    .00000        CLNO      .14008-07     CLO       .36828-05     CLO2      .12846-10     CLSI      .00000
   CL2H2SI   .00000        CL2O      .11569-10     CL2SI     .00000        CL3HSI    .00000        CL4SI     .00000
   H         .80459-01     HN        .70494-05     HO        .74131-02     HSI       .00000        H2N       .39376-08
   H2O2      .47484-07     H3N       .21441-05     H4N2      .18131-13     H4SI      .00000        N         .76693-05
   NO        .46806-03     NO2       .99751-08     NSI       .00000        N2O       .19283-07     N2O3      .12679-16
   N2O4      .26890-22     N2O5      .10035-26     O         .10040-02     OSI       .00000        O2SI      .00000
   O3        .31641-11     SI        .00000        SI2       .00000        SI3       .00000        CCLO      .16998-05
   CLNO2     .23702-13     HNO       .31141-06     HNO2      .11069-08     HNO3      .78013-14     ALHO      .10207-02
   HO2       .16208-06     NO3       .23454-14     CCL2      .44799-11     CCL3      .10606-14     H2N2      .74808-10
   CN2       .36106-11     C2O       .13467-09     C2H       .13260-10     CSI       .00000        CSI2      .00000
   C2N       .55699-12     C2SI      .00000        NSI2      .00000        C2CL4     .35771-23     C2CL6     .33496-33
   ALO2      .49744-04     C2CL2     .61986-15     C2HCL     .31046-12     CHCL      .79986-10     CL3SI     .00000
   CL2       .10691-04     N2        .91745-01     O2        .93117-04     CNO       .73102-08     N3        .20735-10
   C2H3      .19746-13     C2H6      .39184-18     C3H       .27295-15     C3H2      .10612-16     C3H3      .11610-17
   C3H4      .31700-19     C3H5      .53164-19     C4H       .51075-20     C4H2      .56120-21     ALCLO*    .00000
   CSI*      .00000        CLH4N*    .00000        CLH4N2O4* .00000        ALCL3*    .00000        ALN*      .00000
   AL2O5SI*  .00000        C3AL4*    .00000        H4SI3*    .00000        AL*       .00000        AL2O3*    .15764+00
   O2SI*     .00000        SI*       .00000        AL6013S*  .00000
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Sample Problem 2 Output (Continued)

```
        GRAPHITE SURFACE KINETICS (GASKET)    PROB. 2     4000300+00

DERIVATIVE PROPERTY OUTPUT
 CP-FROZEN     CP-EQUIL    DLNM/DLNT    DLNM/DLNP      GAMMA
  .42208+00    .14694+01   -.95479+00    .55542-01    .11133+01

PROPERTY ROUTINE OUTPUT IN  LB-MASS,FT,SEC,BTU,AND DEG-R
   TEMP          VISC          COND          DBAR          PR            SC
 .66873+04     .60935-04     .82537-04     .67562-03     .20531+00     .72416+00
   MU1           MU2         MOL.WT          HTIL          CPTIL         HTIL*
 .72372+00     .19211+02     .32842+02     .67796+04     .96604+00     .44566+04

ELEMENTAL K AND Z MASS FRACTIONS BY ATOMIC NUMBER . . . . (GAMEX =  .667)
      1             6             7             8            13            17            14           106
  .32478-01     .67A53-01     .75171-01     .35979+00     .27332+00     .19138+00     .00000        .00000
  .11435+00     .11673+00     .12993+00     .28765+00     .65560-01     .2857A+00     .00000        .00000

SOLUTION TIMES
        ITERATIONS =    6                          TIME =     1.642 SEC.

CLOSED SYSTEM EQUILIBRIUM SOLUTION OUTPUT

  MASS CONDENSED/MASS GAS =     .73616+00
  TEMP =  6687.2614 DEG R.  =  3715.1452 DEG K.      PRESS =      22.91482 ATM

                                  GAS           CONDENSED        COMPOSITE
  ENTHALPY - BTU/LBM            .19543+04       -.46420+04        -.84259+03
  ENTROPY - BTU/LBM DEG R       .30291+01        .96388+00         .21534+01
  DENSITY - LBM/FT3             .8A753-01                          .15409+00
  MOLECULAR WEIGHT              18.9163          101.9600          32.8417

  VEL2 =      .1760+04 FT/SEC      MACH2 =     .52408    THETA 2 =    .000000 DEG
 ABOVE ARE STATIC CONDITIONS DOWNSTREAM OF THE SHOCK FOR ....
  VEL1 =  .613+04 FT/SEC   H1-STATIC = -.155+04 BTU/LBM   H-TOT = -.781+03 BTU/LBM
  P1 =       5.49553 ATM    RHO1 =     .44203-01 LBM/FT3 THETA 1 =    .000000 DEG

 STATIC CHEMICAL STATE (MOLE FR.=MOLECULES/TOTAL GAS PHASE MOLECULES)...

   SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.
   CO2       .65572-02     H2        .31643+00     H2O       .95764-01     C*        .00000        CLH       .10146+00
   AL        .36066-02     ALN       .34395-06     CH3CL3S   .00000        CO        .17894+00     C2H2      .24690-09
   C         .25328-07     C2        .11888-11     C3        .36136-15     C4        .12391-21     C5        .12456-25
   CAL       .42995-09     ALCL      .31215-01     ALCLO     .59265-02     ALCL2     .75948-02     ALCL3     .93504-04
   ALH       .34166-03     ALH02     .24155-02     ALO       .25390-02     AL2CL6    .27008-11     AL2O      .13299-02
   AL2O2     .12234-04     CCL       .11578-08     CCLN      .16876-07     CCL2O     .38431-09     CCL4      .14001-17
   CH        .13112-07     CHCL3     .21692-14     CHN       .40659-05     CH2O      .22341-06     CHO       .19150-04
   CH2       .46012-08     CH2CL2    .72125-12     CH2O      .71645-06     CH3       .22819-07     CH3CL     .46581-10
   CH4       .31908-08     CN        .29621-06     C2H4      .67417-13     C2H4O     .15619-16     C2N2      .15312-11
   C3O2      .70593-12     C4H2SI    .00000        C4N2      .36169-21     CL        .23150-01     CLHO      .11745-04
   CLH3SI    .00000        CLNO      .10243-06     CLO       .16222-04     CLO2      .25139-09     CLSI      .00000
   CL2H2SI   .00000        CL2O      .12847-09     CL2SI     .00000        CL3HSI    .00000        CL4SI     .00000
   H         .10940+00     HN        .31834-04     HO        .17250-01     HSI       .00000        H2N       .14683-04
   H2O2      .40452-06     H3N       .57483-05     H4O2      .40745-12     H4SI      .00000        I         .35563-04
   NO        .14605-02     NO2       .10217-06     NSI       .00000        N2O       .12316-06     N2O3      .15545-14
   N2O4      .11272-19     N2O5      .18577-23     O         .34610-02     OSI       .00000        O2SI      .00000
   O3        .11910-09     SI        .00000        SI2       .00000        SI3       .00000        CCLO      .54905-05
   CLNO2     .63045-12     HNO       .19269-05     HNO2      .13445-07     HNO3      .33111-12     ALHO      .28048-02
   HO2       .14622-05     NO3       .13378-12     CCL2      .40636-10     CCL3      .11994-13     H2N2      .72596-09
   CN2       .55106-10     C2O       .14718-08     C2H       .15315-09     CSI       .00000        CSI2      .00000
   C2N       .10102-10     C2SI      .00000        NSI2      .00000        C2CL4     .12619-21     C2CL6     .57432-31
   ALO2      .32243-03     C2CL2     .81011-14     C2HCL     .28981-11     CHCL      .79824-09     CL3SI     .00000
   CL2       .18137-04     N2        .67341-01     O2        .41168-03     CNO       .53474-07     N3        .30164-09
   C2H3      .32188-12     C2H6      .86908-17     C3H       .68220-14     C3H2      .36974-15     C3H3      .39845-16
   C3H4      .11337-17     C3H5      .30216-17     C4H       .38138-18     C4H2      .35184-19     ALCLO*    .00000
   CSI*      .00000        CLH4N*    .00000        CLH4NO4*  .00000        ALCL3*    .00000        ALN*      .00000
   AL2O5SI*  .00000        C3AL4*    .00000        N4SI3*    .00000        AL*       .00000        AL2O3*    .13658+00
   O2SI*     .00000        SI*       .00000        AL6013S*  .00000
```

Sample Problem 2 Output (Continued)

```
                GRAPHITE SURFACE KINETICS (GASKET) SOLUTION          PROB. 2


DERIVATIVE PROPERTY OUTPUT
 CP-FROZEN     CP-EQUIL    DLNM/DLNT    DLNM/DLNP      GAMMA
 .42198+00     .14901+01   -.97911+00    .57415-01    .11137+01

PROPERTY ROUTINE OUTPUT IN  LB-MASS,FT,SEC,BTU,AND DEG-R
   TEMP          VISC          COND          DBAR          PR            SC
 .67695+04     .61431-04     .82941-04     .59241-03    .20701+00     .72413+00
   MU1           MU2          MOL.WT         HTIL         CPTIL         HTIL*
 .72531+00     .19255+02     .32735+02     .68589+04    .96296+00     .45142+04

ELEMENTAL K AND Z MASS FRACTIONS BY ATOMIC NUMBER . . . . (GAMEX =  .667)
     1             6             7             8            13            17            14           106
  .32478-01     .67853-01     .75171-01     .35979+00    .27332+00     .19138+00     .00000       .00000
  .11354+00     .11600+00     .12912+00     .28951+00    .68365-01     .28346+00     .00000       .00000

SOLUTION TIMES
        ITERATIONS =    3                          TIME =      .954 SEC.

CLOSED SYSTEM EQUILIBRIUM SOLUTION OUTPUT

  MASS CONDENSED/MASS GAS =     .72300+00
  TEMP =  6769.4843 DEG R.  =  3760.8246 DEG K.      PRESS =      26.66895 ATM

                                GAS              CONDENSED          COMPOSITE
  ENTHALPY - BTU/LBM            .19907+04         -.46140+04          -.78073+03
  ENTROPY - BTU/LBM DEG R       .30105+01          .96803+00           .21534+01
  DENSITY - LBM/FT3             .10248+00                              .17658+00
  MOLECULAR WEIGHT              18.9990           101.9600            32.7352

 ABOVE ARE ISENTROPIC STAGNATION CONDITIONS DOWNSTREAM OF THE SHOCK FOR . . .
  VEL1 =  .613+04 FT/SEC   H1-STATIC = -.153+04 BTU/LBM   H-TOT = -.781+03 BTU/LBM
  P1 =      5.49553 ATM    RHO1 =     .44203-01 LBM/FT3    THETA 1 =     .000000 DEG

 ISEN. STAG. CHEMICAL STATE (MOLE FR.=MOLECULES / TOTAL GAS PHASE MOLECULES)..

   SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.
   CO2       .66244-02     H2        .31344+00     H2O       .96757-01     C*        .00000        CLH       .99490-01
   AL        .41177-02     ALN       .41753-06     CH3CL3S   .00000        CO        .17827+00     C2H2      .31299-09
   C         .31162-07     C2        .16515-11     C3        .53108-15     C4        .21176-21     C5        .23125-25
   CAL       .57655-09     ALCL      .32058-01     ALCLO     .61418-02     ALCL2     .77738-02     ALCL3     .95705-04
   ALH       .38606-03     ALHO2     .26195-02     ALO       .26040-02     AL2CL6    .32038-11     AL2O      .14925-02
   AL2O2     .13972-04     CCL       .14413-08     CCLN      .19762-07     CCL2O     .45073-09     CCL4      .18930-17
   CH        .16502-07     CHCL3     .28403-14     CHN       .46268-05     CHNO      .25955-06     CHO       .21769-04
   CH2       .57256-08     CH2CL2    .90902-12     CH2O      .82266-06     CH3       .27665-07     CH3CL     .10615-09
   CH4       .38123-08     CN        .35097-06     C2H4      .91729-13     C2H4O     .23097-16     C2N2      .20210-11
   C3O2      .94123-12     C4H2SI    .00000        C4N2      .61212-21     CL        .25115-01     CLHO      .12976-04
   CLH3SI    .00000        CLNO      .12094-06     CLO       .18052-04     CLO2      .31630-09     CLSI      .00000
   CL2H2SI   .00000        CL2O      .15714-09     CL2SI     .00000        CL3HSI    .00000        CL4SI     .00000
   H         .11054+00     HN        .36137-04     HO        .16184-01     HSI       .00000        H2N       .16675-04
   H2O2      .48268-06     H3N       .64623-05     H4N2      .56597-12     H4SI      .00000        N         .39890-04
   NO        .15772-02     NO2       .12161-06     NSI       .00000        N2O       .14360-06     N2O3      .23112-14
   N2O4      .18551-19     N2O5      .34535-23     O         .37092-02     OSI       .00000        O2SI      .00000
   O3        .15521-09     SI        .00000        SI2       .00000        SI3       .00000        CCLO      .61653-05
   CLNO2     .82745-12     HNO       .22406-05     HNO2      .16511-07     HNO3      .45079-12     ALHO      .30063-02
   HO2       .17225-05     NO3       .18353-12     CCL2      .50759-10     CCL3      .15528-13     H2N2      .90840-09
   CN2       .71735-10     C2O       .16641-08     C2H       .19863-09     CSI       .00000        CSI2      .00000
   C2N       .13594-10     C2SI      .00000        NSI2      .00000        C2CL4     .19282-21     C2CL6     .10207-30
   ALO2      .36435-03     C2CL2     .10809-13     C2HCL     .37568-11     CHCL      .10042-08     CL3SI     .00000
   CL2       .19006-04     N2        .86590-01     O2        .44950-03     CNO       .64254-07     N3        .38382-09
   C2H3      .44419-12     C2H6      .12957-16     C3H       .47754-14     C3H2      .55444-15     C3H3      .60658-16
   C3H4      .17612-17     C3H5      .49639-17     C4H       .62057-18     C4H2      .57383-19     ALCLO*    .00000
   CSI*      .00000        CLH4N*    .00000        CLH4NO4*  .00000        ALCL3*    .00000        ALN*      .00000
   AL2O5SI*  .00000        C3AL4*    .00000        N4SI3*    .00000        AL*       .00000        AL2O3*    .13472+00
   O2SI*     .00000        SI*       .00000        AL6O13S*  .00000
```

Sample Problem 2 Output (Continued)

```
        GRAPHITE SURFACE KINETICS (GASNET)    PROB. 2     0090000+00
UPDATE OF DIFFUSION FACTORS
        SPECIES     DIFFUSION FACTOR
          CO2              1.29140
          H2                .38930
          H2O               .77490
          CO               1.01700
          C2H2             1.17460
          C                 .69180
          C2               1.02530
          CH                .74920
          CH4               .93570
          CN               1.02670
          H                 .30180
          N                 .74930
          NO                .99810
          O                 .73970
          N2               1.02620
          O2               1.00000

DERIVATIVE PROPERTY OUTPUT
 CP-FROZEN     CP-EQUIL    DLNM/DLNT    DLNM/DLNP      GAMMA
  .35736+00   .18551+02   -.39522+01    .90604-01    .99911+00

PROPERTY ROUTINE OUTPUT IN  LB-MASS,FT,SEC,BTU,AND DEG-R
   TEMP          VISC          COND          DMAS          PR            SC
 .18000+04     .23573-04     .22143-04     .65800-04     .24968+00     .72409+00
   MU1           MU2          POL.WT         MTIL          CPTIL         WTIL0
 .76380+00     .1862A+02     .32735+02     .13115+04     .66736+00     .58277+03

ELEMENTAL K AND Z MASS FRACTIONS BY ATOMIC NUMBER . . . . (GAMEX =  .667)
        1             6             7             8            13            17            14           106
   .32478-01     .67853-01     .75171-01     .35979+00     .27332+00     .19134+00     .00000        .00000
   .96237-01     .11806+00     .13073+00     .29834+00     .49299-01     .28753+00     .00000        .00000

SOLUTION TIMES
        ITERATIONS =    3                          TIME =      .483 SEC.

CLOSED SYSTEM EQUILIBRIUM SOLUTION OUTPUT

  MASS CONDENSED/MASS GAS =     .72300+00
  TEMP =  1800.0000 DEG R.  =  1000.0000 DEG K.      PRESS =      26.66895 ATM

                                    GAS          CONDENSED        COMPOSITE
  ENTHALPY - BTU/LBM             -.25724+03      -.67396+04       -.29774+04
  ENTROPY - BTU/LBM DEG R         .24231+01       .42230+00        .15835+01
  DENSITY - LBM/FT3               .38543+00                        .66609+00
  MOLECULAR WEIGHT               18.9490         101.9600          32.7852

 CHEMICAL STATE  (MOLE FR. = MOLECULES / TOTAL GAS PHASE MOLECULES).....

   SPECIES   MOLE FR.     SPECIES   MOLE FR.     SPECIES   MOLE FR.     SPECIES   MOLE FR.     SPECIES   MOLE FR.
   CO2       .66244-02    H2        .31748+00    H2O       .96757-01    C*        .00000       CLH       .99993-01
   AL        .41177-02    ALN       .41753-06    CH3CL3S   .00000       CO        .17827+00    C2H2      .31299-09
   C         .31162-07    C2        .16815-11    C3        .53108-15    CH        .21172-21    C5        .23125-25
   CAL       .57695-09    ALCL      .32058-01    ALCLO     .61418-02    ALCL2     .77738-02    ALCL3     .95705-04
   ALH       .38606-03    ALHO2     .26195-02    ALO       .24040-02    AL2CL6    .32038-11    AL2O      .14925-02
   AL2O2     .13972-04    CCL       .19413-08    CCL0      .19762-07    CCL2O     .45073-09    CCL4      .18820-17
   CH        .16502-07    CHCL3     .28403-14    CHN       .44264-05    CH2O      .25955-06    CHO       .21769-04
   CH2       .57256-08    CH2CL2    .90902-12    CH2O      .82266-06    CH3       .27463-07    CH3CL     .10615-09
   CH4       .38123-08    CN        .35047-06    C2H4      .91729-13    C2H4O     .23097-16    C2N2      .20210-11
   C3O2      .99123-12    C4H2ST    .00000       C4N2      .61212-21    CL        .23113-01    CLHO      .12976-04
   CLH3SI    .00000       CLNO      .12094-06    CLO       .18052-04    CLO2      .31630-09    CLSI      .00000
   CL2H2SI   .00000       CL2O      .15714-09    CL2SI     .00000       CL3HSI    .00000       CL4SI     .00000
   H         .11054+00    HN        .36137-04    HO        .1H184-01    HSI       .00000       H2N       .16676-04
   H2O2      .48268-06    H3N       .64623-05    H4N2      .56597-12    H4SI      .00000       N         .39800-04
   NO        .15772-02    NO2       .12161-04    NSI       .00000       N2O       .14360-06    N2O3      .23112-14
   N2O4      .10551-19    N2O5      .34535-23    O         .37092-02    OSI       .00000       O2SI      .00000
   O3        .15521-09    SI        .00000       SI2       .00000       SI3       .00000       CCLO      .61655-05
   CLNO2     .82745-12    HNO       .22406-05    HNO2      .16511-07    HNO3      .45079-12    ALHO      .30063-02
   HO2       .17225-05    NO3       .18353-12    CCL2      .50759-10    CCL3      .15528-13    H2N2      .90880-09
   CN2       .71735-10    C2O       .18641-08    C2H       .19463-09    CSI       .00000       CS12      .00000
   C2N       .13598-10    C2SI      .00000       HSI2      .00000       C2CL4     .19282-21    C2CL6     .10207-30
   ALO2      .36435-03    C2CL2     .10809-13    C2HCL     .3756A-11    CHCL      .10042-08    CL4ST     .00000
   CL2       .19006-04    N2        .86990-01    O2        .44950-03    CNO       .64254-07    N3        .38382-09
   C2H3      .44819-12    C2H6      .12457-16    C3H       .97754-14    C3H2      .55444-15    C3H3      .60639-16
   C3H8      .17612-17    C3H5      .49639-17    C4H       .62057-18    C4H2      .57383-19    ALCLO     .00000
   CSI       .00000       CLH4N     .00000       CLH6N2    .00000       ALCL3     .00000       ALN       .00000
   AL2O5SI   .00000       C3AL4     .00000       N4SI3     .00000       AL        .00000       AL2O3     .13972+00
   O2SI      .00000       SI        .00000       AL6O13S   .00000
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Sample Problem 2 Output (Continued)

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        CP-FROZEN=   .37638+00

PROPERTY ROUTINE OUTPUT IN  LB-MASS,FT,SEC,BTU,AND DEG-R
    TEMP          VISC          COND          DBAR          PR            SC
  .21600+04     .26088-04     .25662-04     .87090-04     .39318+00     .72457+00
    RU1           RU2          MOL.WT         HTIL          CPTIL         HTILO
  .83987+00     .20534+02     .25884+02    -.11610+04     .68087+00    -.13330+04

ELEMENTAL K AND Z MASS FRACTIONS BY ATOMIC NUMBER . . . . (GAMEX =  .667)
      1             6             7             8            13            17            19           106
   .98009-01     .10165+00     .11071+00     .24012+00     .98537-01     .98033+00     .50674-05     .00000
   .96289-01     .11809+00     .13073+00     .29834+00     .69295-01     .24731+00     .46902-05     .00000

SOLUTION TIMES
        ITERATIONS =   29                          TIME =    9.589 SEC.

OPEN SYSTEM CHEMICAL KINETICS SOLUTION OUTPUT

 SURFACE IS SIC/PG
 MASS TRANSFER COEFFICIENT ROUGH =    .96300+00
 RHO V WALL/RHOE UE CM =    .44639-04    HERINE =    .44639-04

 STATE ADJACENT TO THE SURFACE . . . .
  TEMP =  2160.0000 DEG R =  1200.0000 DEG K     PRESS =     26.66895 ATM

                                GAS              CONDENSED         COMPOSITE
  ENTHALPY - BTU/LBM          -.15525+04          .00000           -.15525+04
  ENTROPY - BTU/LBM DEG R      .20017+01          .00000            .00000
  DENSITY - LBM/FT3            .43759+00                            .43759+00
  MOLECULAR WEIGHT            25.8842              .0000            25.8842


 NET FORWARD RATE OF KINETICALLY CONTROLLED REACTIONS
  (MOLES OF REACTION / UNIT SURFACE AREA / TIME / RHOE UE CM). . . .
  1=   .59581-06  2=   .27601-05  3=   .21304-10  4=   .21079-23  5=   .16877-26
  6=   .66781-26  7=   .60427-32  8=   .50836-34

RATIO OF FORWARD TO REVERSE KINETICALLY CONTROLLED PRODUCTION RATES
 1=   .3288A+01  2=   .3288A+01  3=   .10816+02  4=   .32088+01  5=   .10816+02
 6=   .35572+02  7=   .42073-04  8=   .30184-06

 CHEMICAL STATE ADJACENT TO THE SURFACE
  (MOLE FR FOR GASES = MOLECULES / TOTAL GAS MOLECULES )
  (MOLE FR FOR CONDENSED = SPRIME CONDENSED ). . . .

  SPECIES  MOLE FR.     SPECIES  MOLE FR.     SPECIES  MOLE FR.     SPECIES  MOLE FR.     SPECIES  MOLE FR.
  CO2      .40879+01    H2       .42502+00    H2O      .15113+00    C=       .00000    CLM      .10230-01
  AL       .27935-14    ALN      .20656-21    CH3CL3S  .21331-09    CO       .15557+00    C2H2     .47929-08
  C        .12600-24    C2       .15941-28    C3       .47686-27    C4       .13707-34    C5       .52747-35
  CAL      .74628-28    ALCL     .57369-06    ALCLO    .15827-05    ALCL2    .97685-03    ALCL3    .68782-01
  ALH      .35058-13    ALHO2    .74119-06    ALO      .10324-14    AL2CL6   .22904-02    AL2O     .77191-11
  AL2O2    .28495-12    CCL      .21845-23    CCLN     .11774-11    CCL2O    .62767-14    CCL4     .98809-27
  CH       .38662-21    CHCL3    .42580-19    CHN      .46919-05    CHNO     .12279-06    CHO      .66837-09
  CH2      .28693-19    CH2CL2   .12754-12    CH2O     .18384-05    CH3      .30078-07    CH3CL    .11267-06
  CH4      .22592-01    CN       .48916-15    C2H4     .56033-04    C2H4O    .54886-14    C2N2     .56067-13
  C3O2     .26131-12    C4H2ST   .21327-15    C4N2     .12867-21    CL       .55377-09    CLHO     .62061-13
  CLH3SI   .13868-05    CLNO     .14849-19    CLO      .92521-19    CLO2     .47599-31    CLSI     .31085-14
  CL2H2SI  .47989-07    CL2O     .23641-27    CL2SI    .11439-07    CL3HSI   .39014-07    CL4ST    .54891-06
  H        .24800-07    HCl      .40799-14    HO       .67977-10    HSI      .53955-16    H2N      .40564-09
  H2O2     .16386-16    H3N      .44867-03    HNO2     .14564-14    H4SI     .72323-10    I        .25990-18
  NO       .14821-12    NO2      .23967-22    NSI      .11081-16    N2O      .16621-16    N2O3     .00000
  N2O4     .00000       N2O5     .00000       O        .42029-17    OSI      .25232-05    O2SI     .42181-09
  O3       .53704-36    SI       .98690-18    SI2      .14701-26    SI3      .31254-32    CCLO     .22529-10
  CLNO2    .50891-31    HNO      .15797-15    HNO2     .62473-20    HNO3     .22189-30    ALHO     .15982-06
  HO2      .11399-20    NO3      .58541-37    CCL2     .37581-21    CCL3     .75063-24    H2N2     .86176-15
  CN2      .37960-20    C2O      .12163-16    C2H      .12695-15    CSI      .11571-27    CS12     .29665-24
  C2N      .18942-19    C2SI     .66610-23    HSI2     .21522-21    C2CL4    .21728-29    C2CL6    .00000
  AL2O     .38095-15    C2CL2    .36320-20    C2HCL    .12642-13    CHCL     .11958-18    CL3SI    .93370-07
  CL2      .32313-12    N2       .10206+00    O2       .76456-18    CHO      .33204-15    NS       .12775-21
  C2H3     .50928-12    C2H6     .27511-05    C3H      .95214-18    C3H2     .14913-16    C3H3     .19866-13
  C3H4     .77395-11    C3H5     .58912-09    C4H      .10980-21    C4H2     .23952-17
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Sample Problem 2 Output (Concluded)

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        GRAPHITE SURFACE KINETICS (GARNET)    PROB. 2     5000000+00


         CP-FROZEN=   .58033+00

PROPERTY ROUTINE OUTPUT IN  LB-MASS,FT,SEC,ATU,AND DEG-R
    TEMP          VISC          COND          DMAR          PP            SC
  .25200+04     .2969A-04     .2924A-04     .11499-03     .58617+00     .72471+00
    RU1           RU2          MOL.WT         HTIL          CPTIL         HTILO
  .82810+00     .20169+02     .24940+02    -.75176+03     .70007+00    -.10096+04

ELEMENTAL K AND Z MASS FRACTIONS BY ATOMIC NUMBER . . . . (GAMCA =  .667)
     1             6             7             8            15            17            18           106
   .47829-01     .10288+00     .11222+00     .24211+00     .98068-01     .39687+00     .35652-04     .00000
   .96221-01     .11832+00     .13069+00     .29824+00     .69266-01     .28720+00     .35649-04     .00000

SOLUTION TIMES
        ITERATIONS =   11                          TIME =    3.675 SEC.

OPEN SYSTEM CHEMICAL KINETICS SOLUTION OUTPUT

 SURFACE IS SIC/PG
 MASS TRANSFER COEFFICIENT RHOUE =     .96300+00
 RHO V WALL/RHOE UE CM =     .33747-03   RPRIME =     .33747-03

 STATE ADJACENT TO THE SURFACE . . . .
  TEMP =  2520.0000 DEG R =  1400.0000 DEG K      PRESS =     26.66895 ATM

                                GAS              CONDENSED         COMPOSITE
  ENTHALPY - BTU/LBM          -.13133+04          .00000            -.13133+04
  ENTROPY - BTU/LBM DEG R      .20949+01          .00000             .00000
  DENSITY - LBM/FT3            .36139+00                             .36139+00
  MOLECULAR WEIGHT            24.9401              .0000            24.9401


 NET FORWARD RATE OF KINETICALLY CONTROLLED REACTIONS
  (MOLES OF REACTION / UNIT SURFACE AREA / TIME / RHOE UE CM). . . .
  1=   .53A28-05  2=   .19761-04  3=   .58105-09  4=   .76104-14  5=   .27709-21
  6=   .66291-21  7=   .58943-26  8=   .55636-28

RATIO OF FORWARD TO REVERSE KINETICALLY CONTROLLED PRODUCTION RATES
 1=   .16749+02  2=   .15789+02  3=   .20180+03  4=   .16789+02  5=   .20188+03
 6=   .97329+04  7=   .39939+02  8=   .37005+00

 CHEMICAL STATE ADJACENT TO THE SURFACE
  (MOLE FR FOR GASES = MOLECULES / TOTAL GAS MOLECULES )
  (MOLE FR FOR CONDENSED = MPRIME CONDENSED ). . . .

   SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.
   CO2       .26909-01     H2        .99322+00     H2O       .15805+00     C=        .00000      CLH       .14996-01
   AL        .67AA9-11     ALH       .23631-17     CH3CL3S   .64435-11     CO        .16533+00     C2H2      .44001-08
   C         .71227-21     C2        .9F747-25     C3        .57354-28     CN        .20939-31     C5        .17944-32
   CAL       .61Ue1-2F     ALCl      .33044-08     ALCLO     .63475-09     ALCL2     .73e61-02     ALCL3     .82370-01
   ALH       .32045-10     ALHO2     .21947-08     ALO       .24468-11     AL2CL4    .40969-39     AL2O      .17444-07
   AL2O2     .40251-09     CCL       .30A51-20     CCLO      .93461-11     CCL2O     .5U494-13     CCL4      .51203-25
   CH        .37341-1A     CHCL3     .32716-18     CHO       .61937-05     CH2O      .16705-06     CHO       .71289-08
   CH2       .135A2-13     CH2CL2    .1A331-12     CH2O      .14100-05     CH3       .44150-07     CH3CL     .31491-07
   CH4       .13096-02     CN        .41A20-13     C2H4      .49772-07     C2H4O     .2F137-14     C2N2      .18349-12
   C3O2      .5061A-12     C4H2SI    .72A69+20     C4H2      .41494-21     CL        .17607-07     CLHO      .27303-11
   CLH3SI    .74722-06     CLAO      .5A414-17     CLO       .64145-16     CLO2      .11489-26     CLSI      .44140-12
   CL2H2SI   .2914A-07     CL2O      .A0AA6-24     CL2SI     .43274-07     CL3HSI    .14799-07     CL4SI     .77215-07
   H         .62A02-06     HO        .5Z724-12     HO2       .37417-14     HSI       .19A64-13     H2N       .42640-08
   H2O2      .21A20-14     H3O       .21A36-03     H3N2      .7414A-14     H4SI      .19615-09     N         .23922-15
   NO        .16626-10     NO2       .36302-19     OSI       .37A74-14     S2O       .17002-14     N2O3      .32049-36
   N2O4      .00000        N2O5      .00000        O         .49271-14     OS1       .3U438-04     O2S1      .AA956-08
   O3        .12666-30     S1        .107A7-14     S1O       .2542F-22     S1O       .13783-27     CCLO      .29989-09
   CLNO2     .33A35-27     NHO       .19762-13     HNO2      .1963A-17     HNO3      .99422-27     ALHO      .7AA11-05
   NO2       .14327-17     NO3       .5QIA3-32     FCL2      .64734-19     CFL3      .80622-22     H2N2      .17055-13
   CN2       .66A43-14     C2O       .e7402-15     C2N       .43197-14     CSI       .12U32-23     CS1O      .34592-21
   C2N       .21770-17     C2S1      .2811e-20     HS1O      .19773-14     C2CL4     .73178-29     C2CL4     .00000
   AL2O      .62A53-12     C2Cl2     .9A425-19     L2HCL     .57945-13     CHCL      .15645-16     CL3S1     .90011-07
   CL2       .98279-11     N2        .99745-01     O2        .73650-15     CNO       .19665-13     H2        .50247-19
   C2H3      .9U87e-12     C2HE      .20A6C-07     C3H       .14U12-16     C3H2      .65019-16     C3H3      .12A12-13
   C3H4      .70765-12     C3H5      .27060-10     C4H       .1E975-20     C4H2      .29155-17
```

Sample Problem 3

In this problem, all options which require the input of thermophysical properties are utilized. The surface material option of carbon/carbon 901 is used. The edge thermodynamic state (2805.81°K and 12.778 atm) is input directly. Diffusion factors for 16 selected species are input. Preexponential factors, activation energies, and temperature exponents are input for each of the eight possible kinetically controlled reactions, and inhibiting coefficients are input only for the three oxidation reactions. Finally, two frozen-edge temperatures and two surface temperatures are input to be used in lieu of the corresponding built-in temperature arrays.

Listing of Input

```
0037223400  2805.81   12.778      0.0         0.0      0.246       0.       PROB. 5
  1000.
  1500.

  1200.
  1400.

  5
  1 HYDROGEN      1.008      3.6732
  6 CARBON       12.011      1.6865                1.0
  7 NITROGEN     14.007      1.2430
  8 OXYGEN       16.000      3.6376
  9 FLUORINE     19.000      0.022683
 16
C              0.69180CH             0.74920CH4            0.93570CN             1.02670
CO             1.01700C02            1.25140C2H2           1.17460H              0.30180
H2             0.38930H20            0.77490N              0.74930NO             0.99810
N2             1.026200              0.7397002             1.00000C2             1.02530
  1  6  2  8  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  3/61          CO2
-94053E+5 36636E+5 13073E+2 73366-3-75452E+6 79884E+2  500. 2500.1  -0.CO2
-94053E+5 36561E+5 14266E+2 20983E-3-23397E+5 79858E+2 2500. 6000.1  -0.CO2
  2  1  0  0  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  3/61           H2
-996  0+0 21268E+5 62626E+1 934668-3 61091E+5 48485E+2  500. 2500.1  -0.H2
-996  0+0 21222E+5 80030E+1 362 19-3-18687E+7 48469E+2 2500. 6000.1  -0.H2
  2  1  1  8  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  3/61          H2O
-57797E+5 30389E+5 84749E+1 183253-2-30537E+6 68487E+2  500. 2500.1  -0.H2O
-57797E+5 30249E+5 132  8E+2 231126-3-48199E+7 68485E+2 2500. 6000.1  -0.H2O
  1  6  1  8  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  3/61           CO
-26416E+5 22420E+5 77994E+1 441449-3-262 21E6 65392E+2  500. 2500.1  -0.CO
-26416E+5 22374E+5 86694E+1 865971-4-15517E+6 65376E+2 2500. 6000.1  -0.CO
 1106  0  0  0  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  3/61           C*
   0  0+0 14447E+5 55039E+1 240 14-3-55963E+6 12141E+2  500. 2500.2  -0.C*
   0  0+0 14419E+5 52635E+1 216128-3 13132E+7 12131E+2 2500. 6000.2  -0.C*
  1 17  1  1  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  9/64          CLH
-22052E+5 21947E+5 70559E+1 710907-3-13629E+6 62393E+2  500. 2500.1  -0.CLH
-22052E+5 21886E+5 86336E+1 132815-3-96431E+6 62371E+2 2500. 6000.1  -0.CLH
  1  9  1  1  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/68           FH
-65139E+5 21121E+5 64131E+1 828856-3 24079E+5 58719E+2  500. 2500.1  -0.FH
-65139E+5 21070E+5 85585E+1 13F134-3-25923E+7 587 11+2 2500. 6000.1  -0.FH
  1 13  0  0  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/65           AL
 77999E+5 13478E+5 49186E+1 303528-4 23392E+5 50850E+2  500. 2500.1  -0.AL
 77999E+5 13452E+5 862 42+1 277499-3 42753E+7 50841E+2 2500. 6000.1  -0.AL
  1 13  1  7  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  3/67          ALN
 104  0+6 239 70+5 88824E+1 131622-3-14755E+6 70367E+2  500. 2500.1  -0.ALN
 104  0+6 239 17+5 89166E+1 946575-4-146 36+6 70365E+2 2500. 6000.1  -0.ALN
  2  7  0  0  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 **/61           N2
-110  0+0 22236E+5 76039E+1 501467-3-23470E+6 63790E+2  500. 2500.1  -0.N2
-110  0+0 22184E+5 85894E+1 972320-4-78141E+5 63771E+2 2500. 6000.1  -0.N2
  1  6  0  0  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  3/61            C
 17085E+6 13524E+5 48617E+1 753554-4 22087E+5 49278E+2  500. 2500.1  -0.C
 17085E+6 13549E+5 51471E+1 766698-4-17819E+7 49287E+2 2500. 6000.1  -0.C
  1 13  1 17  1  8  0  0  0  0  0  0  0  0JANAF TAPE 7/71  9/64         ALCLO
-83199E+5 392 7E+5 14792E+2 416848-4-33254E+6 92046E+2  500. 2500.1  -0.ALCLO
-83199E+5 392 1E+5 14878E+2 385241-5-27930E+6 92044E+2 2500. 6000.1  -0.ALCLO
```

```
55.      1  1  1  8  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/70          HO
56.     9491999+4 21489E+5 65792E+1 822769-3-430 21+4 61383E+2  500. 2500.1  -0.HO
57.     9491999+4 21429E+5 65194E+1 15866 8-3-17545/+7 613627+2 2500. 6000.1  -0.HO
58.      1  7  3  8  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/64          HO3
59.     1699999+5 49870145 15169E+2 260574-3-11252E+7 99913E+2  500. 2500.1  -0.HO3
60.     1699999+5 49836E+5 197111+2 240799-4-81434E+6 999 18+2 2500. 6000.1  -0.HO3
61.      2 17  6  0  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 **/60          CL2
62.     -856  0+0 24398E+5 893383+1 117741-3-93682+5 73749+2  500. 2500.1  -0.CL2
63.     -856  0+0 24436E+5 97059Z+1 390773-4-369 14+7 73762E+2 2500. 6000.1  -0.CL2
64.      1 13  1 17  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  6/70          ALCL
65.     -1229999+5 24451E+5 88663E+1 152841-3-55022E+5 750155+2  500. 2500.1  -0.ALCL
66.     -1229999+5 24416E+5 86652E+1 671716-3 74694Z+7 750 29+2 2500. 6000.1  -0.ALCL
67.      1 13  2 17  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  9/64          ALCL2
68.     -7499999+5 37095E+5 13889Z+2 809140-5-15961+6 100 56+3  500. 2500.1  -0.ALCL2
69.     -7499999+5 37093E+5 139 4E+2 943852-6-145 21+6 100 56+3 2500. 6000.1  -0.ALCL2
70.      1 13  3 17  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  6/70          ALCL3
71.     -1396999+5 52812E+5 198157+2 198316-4-28366E+6 11944Z+3  500. 2500.1  -0.ALCL3
72.     -1396999+5 52810E+5 198586+2 193  1-5-2542994+6 11944E+3 2500. 6000.1  -0.ALCL3
73.      1 13  1  1  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  6/63          ALH
74.     6199999+5 23426+5 830955+1 388206-3-30152E+6 63842Z+2  500. 2500.1  -0.ALH
75.     6199999+5 23398E+5 881 31+1 179608-3-17189E+6 63832+2 2500. 6000.1  -0.ALH
76.      1 13  1  1  1  8  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/67 ALOH    ALHO
77.     -4299999+5 34347+5 118221+2 100 86-2-79692E+6 761703+2  500. 2500.1  -0.ALHO
78.     -4299999+5 34252+5 143840+2 742179-4-23611E+7 76136E+2 2500. 6000.1  -0.ALHO
79.      1 13  1  1  1  8  0  0  0  0  0  0  0  0JANAF TAPE 7/71  5/64 HALO    ALHO
80.     7999999+4 36795E+5 139537+2 348155-3-922 73+6 803765+2  500. 2500.1  -0.ALHO
81.     7999999+4 36751+5 146970+2 308795-4-61043E+6 80361E+2 2500. 6000.1  -0.ALHO
82.      1 13  1  1  2  8  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/68          ALHO2
83.     -1099999+5 48162+5 171817+2 876461-3-81729E+6 99013E+2  500. 2500.1  -0.ALHO2
84.     -1099999+5 46078E+5 194272+2 643 25-4-215 59+7 989840+2 2500. 6000.1  -0.ALHO2
85.      1 13  1  8  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  5/70          ALO
86.     1599999+5 27098+5 742567+1 160497-2-49078+5 73387+2  500. 2500.1  -0.ALO
87.     1999999+5 26859E+5 119322+2-233234-3 58484Z+6 733 26+2 2500. 6000.1  -0.ALO
88.      1 13  2  8  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/68          ALO2
89.     -4399999+5 36959+5 147 25+2 796767-4-39789E+6 90886Z+2  500. 2500.1  -0.ALO2
90.     -4399999+5 38942E+5 139242+2 224352-3 22059Z+7 90882Z+2 2500. 6000.1  -0.ALO2
91.      2 13  6 17  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  6/70          AL2CL6
92.     -3096399+5 11623946 436264+2 340883-4-61080E+6 21122E+3  500. 2500.1  -0.AL2CL6
93.     -3096399+5 11623+46 43695E+2 328312-5-55956E+6 21122E+3 2500. 6000.1  -0.AL2CL6
94.      2 13  1  8  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  9/65          AL2O
95.     -3139999+5 36361Z+5 137284+2 678596-4-37134E+6 92028E+2  500. 2500.1  -0.AL2O
96.     -3139999+5 36352+5 138685+2 632719-5-285 47+6 92020Z+2 2500. 6000.1  -0.AL2O
97.      2 13  2  8  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  9/65          AL2O2
98.     -9699999+5 50532+5 193485+2 194849-3-947805+6 10430Z+3  500. 2500.1  -0.AL2O2
99.     -9699999+5 505 7+5 197524+2 178859-4-70767E+6 10429E+3 2500. 6000.1  -0.AL2O2
100.     1  6  1 13  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  6/63          CAL
101.    1647999+6 24161+5 8E885Z+1 127908-3-150 98+6 73495E+2  500. 2500.1  -0.CAL
102.    1647999+6 24159+5 893143+1 109290-3-12883E+6 73494E+2 2500. 6000.1  -0.CAL
103.     1  6  1 17  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/69          CCL
104.    1199999+6 24045+5 883715+1 138774-3-16167E+6 73627E+2  500. 2500.1  -0.CCL
105.    1199999+6 240350+5 811612+1 287235-3 20250Z+7 73623E+2 2500. 6000.1  -0.CCL
106.     1  6  1 17  1  7  0  0  0  0  0  0  0  0JANAF TAPE 7/71  6/66          CCLN
107.    3296994+5 38734E+5 136 17+2 729482-3-48369E+6 87654E+2  500. 2500.1  -0.CCLN
108.    3296994+5 38687E+5 146601+2 308 68-3-51415E+6 87636E+2 2500. 6000.1  -0.CCLN
109.     1  6  1 17  1  8  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/65          CCLO
110.    -1499999+5 35563E+5 15044+2 309923-3-41186E+6 92680Z+2  500. 2500.1  -0.CCLO
111.    -1499999+5 35526E+5 157371+2 257704-4-30170E+6 92667Z+2 2500. 6000.1  -0.CCLO
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112.    1  6  2 17  0  0   0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/68          CCL2
113.  5699999+5 403610+5 14352I+2 703546-3-63655?+6 957249+2  500. 2500.1  -0.CCL2
114.  5699999+5 401173+5 142490+2-156868-5 11025548 956386+2 2500. 6000.1  -0.CCL2
115.    1  6  2 17  1  8   0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  6/61        CCL2O
116. -525999+5 506522+5 189516+2 332 45-3-752370+6 108915+3  500. 2500.1  -0.CCL2O
117. -525999+5 506119+5 19H832+2 280999-4-57552+6 108904+3 2500. 6000.1  -0.CCL2O
118.    1  6  3 17  0  0   0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  6/70         CCL3
119.  1899999+5 514270+5 196590+2 792656-4-54677?+6 113779+3  500. 2500.1  -0.CCL3
120.  1899999+5 519166+5 19821?+2 743343-5-4421999+6 113775+3 2500. 6000.1  -0.CCL3
121.    1  6  4 17  0  0   0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/68         CCL4
122. -229999+5 677152+5 256419+2 714623-4-65951?+6 130 40+3  500. 2500.1  -0.CCL4
123. -229999+5 677 59+5 257890+2 656752-5-564A03+6 130 37+3 2500. 6000.1  -0.CCL4
124.    1  6  1  1  0  0   0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/67          CH
125.  1419999+6 236499+5 684765+1 122313-2-15722?+6 623591+2  500. 2500.1  -0.CH
126.  1419999+5 235  6+5 959410+1 141 78-3 83461+6 622866+2 2500. 6000.1  -0.CH
127.    1  6  1  1  1 17   0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/69         CHCL
128.  7999999+5 673682+5 145125+2 302110-3-131 944+7 851119+2  500. 2500.1  -0.CHCL
129.  7999999+5 672174+5 134606+2 112657-3 82234+7 850565+2 2500. 6000.1  -0.CHCL
130.    1  6  1  1  3 17   0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/68         CHCL3
131. -246599+5 635454+5 232 42+2 891117-3-116712+7 121166+3  500. 2500.1  -0.CHCL3
132. -246599+5 634516+5 253664+2 680740-4-183336+7 121133+3 2500. 6000.1  -0.CHCL3
133.    1  6  1  1  1  7   0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/69          CHN
134.  3299999+5 350311+5 115170+2 121972-2-60797?+6 754838+2  500. 2500.1  -0.CHN
135.  3299999+5 349247+5 147715+2 871 50-4-325134+7 754462+2 2500. 6000.1  -0.CHN
136.    1  6  1  1  1  7   1  8  0  0  0  0  0  0  0JANAF TAPE 7/71 12/70         CHNO
137. -2499999+5 463936+5 159 26+2 131 62-2-938162+6 930 47+2  500. 2500.1  -0.CHNO
138. -2499999+5 462643+5 192  3+2 974790-4-25932?+7 929589+2 2500. 6000.1  -0.CHNO
139.    1  6  1  1  1  8   0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/70          CHO
140.  1039999+5 330286+5 114114+2 898575-3-729166+6 794  0+2  500. 2500.1  -0.CHO
141.  1039999+5 329420+5 133135+2 164370-3-114482+7 793695+2 2500. 6000.1  -0.CHO
142.    1  6  2  1  0  0   0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  6/69          CH2
143.  9206999+5 539279+5 108245+2 148288-2-784969+6 689918+2  500. 2500.1  -0.CH2
144.  9206999+5 537799+5 145532+2 106718-3-258669+7 689395+2 2500. 6000.1  -0.CH2
145.    1  6  2  1  2 17   0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/68         CH2CL2
146. -2249999+5 597425+5 208 33+2 169827-2-155760+7 110247+3  500. 2500.1  -0.CH2CL2
147. -2249999+5 595657+5 249576+2 128117-3-298429+7 110185+3 2500. 6000.1  -0.CH2CL2
148.    1  6  2  1  1  8   0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  3/61         CH2O
149. -2749999+5 440617+5 146557+2 179555-2-142597+7 849549+2  500. 2500.1  -0.CH2O
150. -2749999+5 438655+5 185280+2 13A946-3-224412+7 849156+2 2500. 6000.1  -0.CH2O
151.    1  6  3  1  0  0   0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  6/69          CH3
152.  3481999+5 429445+5 130653+2 224651-2-975622+6 786134+2  500. 2500.1  -0.CH3
153.  3481999+5 427268+5 187455+2 164158-3-393997+7 785354+2 2500. 6000.1  -0.CH3
154.    1  6  3  1  1 17   0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  9/64         CH3CL
155. -2065999+5 563830+5 184696+2 248246-2-181714+7 975262+2  500. 2500.1  -0.CH3CL
156. -2065999+5 561252+5 245600+2 186431-3-400629+7 974351+2 2500. 6000.1  -0.CH3CL
157.    1  6  4  1  0  0   0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  3/61          CH4
158. -1784949+5 535392+5 161977+2 324522-2-191745+7 827619+2  500. 2500.1  -0.CH4
159. -1784949+5 532 32+5 241785+2 242162-3-487445+7 825431+2 2500. 6000.1  -0.CH4
160.    1  6  1  7  0  0   0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  6/69          CN
161.   104  0+6 231992+5 722591+1 901725-3-143911+6 669577+2  500. 2500.1  -0.CN
162.   104  0+6 232642+5 118745+2-654511-4-140858+6 669809+2 2500. 6000.1  -0.CN
163.    1  6  1  7  1  8   0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/70         CNO
164.  3809999+5 370504+5 136709+2 446500-3-718686+6 850301+2  500. 2500.1  -0.CNO
165.  3809999+5 369913+5 142307+2 129228-3 73957+6 850 92+2 2500. 6000.1  -0.CNO
166.    1  6  2  7  0  0   0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/70 NCN     CN2  NCN
167.  1129999+6 377350+5 141690+2 272475-3-661240+6 844463+2  500. 2500.1  -0.CN2  NCN
168.  1129999+5 376945+5 143532+2 104945-3 80499+6 844320+2 2500. 6000.1  -0.CN2  NCN
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169.    2  6  2 17  0  0   0  0  0   0  0  0  0  0JANAF TAPE 7/71 12/68          C2CL2
170.  500499+5 532754+5 19566+2 457680-3-617312+6 108571+3  500. 2500.1  -0.C2CL2
171.  500999+5 532228+5 20615+2 369235-4-6013966+6 108552+3 2500. 6000.1  -0.C2CL2
172.    2  6  1  1  0  0   0  0  0   0  0  0  0  0JANAF TAPE 7/71 12/68          C2H
173.  113999+6 356561+5 113 96+2 142644-2-495 54+6 773461+2  500. 2500.1  -0.C2H
174.  113999+6 356400+5 172 51+2-959518-4-13554+8 773405+2 2500. 6000.1  -0.C2H
175.    2  6  1  1  1 17   0  0  0   0  0  0  0  0JANAF TAPE 7/71 12/68          C2HCL
176.  510999+5 502940+5 17523+2 110696-2-76441+6 976 67+2  500. 2500.1  -0.C2HCL
177.  510999+5 501839+5 203 48+2 815 95-4-21230+7 977678+2 2500. 6000.1  -0.C2HCL
178.    2  6  2  1  0  0   0  0  0   0  0  0  0  0JANAF TAPE 7/71  3/61          C2H2
179.  541499+5 484894+5 152700+2 213068-2-90355+6 950523+2  500. 2500.1  -0.C2H2
180.  541099+5 483179+5 19961+2 451477-3-38598+7 849917+2 2500. 6000.1  -0.C2H2
181.    2  6  4  1  0  0   0  0  0   0  0  0  0  0JANAF TAPE 7/71  9/65          C2H4
182.  125399+5 679 30+5 218640+2 333365-2-23854+7 101592+3  500. 2500.1  -0.C2H4
183.  125399+5 675604+5 30093+2 248653-3-56153+7 101471+3 2500. 6000.1  -0.C2H4
184.    2  6  4  1  1  8   0  0  0   0  0  0  0  0JANAF TAPE 7/71  9/65          C2H4O
185.  -125799+5 818211+5 27424+2 348693-2-305 39+7 11 .08+3  500. 2500.1  -0.C2H4O
186.  -125799+5 814570+5 3595+2+2 263589-3-5977+0+7 1 60+3 2500. 6000.1  -0.C2H4O
187.    2  6  1  7  0  0   0  0  0   0  0  0  0  0JANAF TAPE 7/71  3/67          C2N
188.  132999+5 384863+5 14541+2 135841-3-51461+6 566366+2  500. 2500.1  -0.C2N
189.  132999+6 384653+5 14597+2 586896-4 340163+6 866291+2 2500. 6000.1  -0.C2N
190.    2  6  2  7  0  0   0  0  0   0  0  0  0  0JANAF TAPE 7/71  3/61          C2N2
191.  738699+5 512470+5 18327+2 889 50-4-871640+6 985977+2  500. 2500.1  -0.C2N2
192.  738699+5 511460+5 203898+2 704562-4-870377+6 985620+2 2500. 6000.1  -0.C2N2
193.    2  6  1  8  0  0   0  0  0   0  0  0  0  0JANAF TAPE 7/71  9/66          C2O
194.  684999+5 387544+5 13516+2 852350-3-613 11+6 864985+2  500. 2500.1  -0.C2O
195.  684999+5 386404+5 15961+2-101 89-3-99653+6 864582+2 2500. 6000.1  -0.C2O
196.    3  6  2  8  0  0   0  0  0   0  0  0  0  0JANAF TAPE 7/71  5/68          C3O2
197.  -223799+5 654763+5 23720+2 109673-2-13495+7 117669+3  500. 2500.1  -0.C3O2
198.  -223799+5 653499+5 26228+2 885573-4-127 91+7 11762+3 2500. 6000.1  -0.C3O2
199.    1  1  4  6  0  0   0  0  0   0  0  0  0  0DUFF BAUER 6/61              C4H
200.  155196+6 645030+5 252172+2 574336-3-33954+7 113166+3  500. 3000.1   0.C4H
201.  155196+6 645030+5 249358+2 402513-3 37767+7 113166+3 3000. 6000.1   0.C4H
202.    2  1  4  6  0  0   0  0  0   0  0  0  0  0DUFF BAUER 6/61              C4H2
203.  111715+6 763230+5 298897+2 735927-3-43064+7 119311+3  500. 3000.1   0.C4H2
204.  111715+6 763230+5 301707+2 456896-3 69812+6 119311+3 3000. 6000.1   0.C4H2
205.    4  6  2  7  0  0   0  0  0   0  0  0  0  0JANAF TAPE 7/71  5/61          C4N2
206.  127499+6 803415+5 289 30+2 136592-2-14671+7 133142+3  500. 2500.1  -0.C4N2
207.  127499+6 801850+5 320530+2 108998-3-15347+7 133 86+3 2500. 6000.1  -0.C4N2
209.    1 17  0  0  0  0   0  0  0   0  0  0  0  0JANAF TAPE 7/71  5/61          CL
209.  289219+5 140 53+5 540852+1-150184-3 383675+5 51614+2  500. 2500.1  -0.CL
210.  289219+5 140216+5 505231+1-122307-4 109159+6 51620+2 2500. 6000.1  -0.CL
211.    1 17  1  1  1  8   0  0  0   0  0  0  0  0JANAF TAPE 7/71  5/61          CLHO
212.  -21999+5 330445+5 11267+2 836916-3-43759+6 628621+2  500. 2500.1  -0.CLHO
213.  -21999+5 329709+5 134941+2 595757-4-22054+7 828361+2 2500. 6000.1  -0.CLHO
214.    1 17  1  7  1  8   0  0  0   0  0  0  0  0JANAF TAPE 7/71 12/65          CLNO
215.  123699+5 371577+5 15087+2 660746-3-44066+6 925616+2  500. 2500.1  -0.CLNO
216.  123699+5 371223+5 15746+2 389803-3-32821+6 925491+2 2500. 6000.1  -0.CLNO
217.    1 17  1  7  2  8   0  0  0   0  0  0  0  0JANAF TAPE 7/71 12/65          CLNO2
218.  28999+4 49999+5 168 21+2 389864-3-94839+6 105 93+3  500. 2500.1  -0.CLNO2
219.  28999+4 49951+5 196438+2 340266-4-64929+6 105 76+3 2500. 6000.1  -0.CLNO2
220.    1 17  1  8  0  0   0  0  0   0  0  0  0  0JANAF TAPE 7/71  5/61          CLO
221.  241919+5 240629+5 86561+1 142476-3-17985+6 740955+2  500. 2500.1  -0.CLO
222.  241919+5 240587+5 89228+1 113191-3-13928+6 740940+2 2500. 6000.1  -0.CLO
223.    1 17  2  8  0  0   0  0  0   0  0  0  0  0JANAF TAPE 7/71  3/61          CLO2
224.  24999+5 366  7+5 155732+2 299167-3-5141+1+6 911417+2  500. 2500.1  -0.CLO2
225.  24999+5 365846+5 138352+2 185627-3-377 66+6 911360+2 2500. 6000.1  -0.CLO2
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226.     2 17  1  0  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/65            CL20
227.     209999+5 367286+5 156426+2 253560-4-274 23+6 946368+2  500. 2500.1  -0.CL20
228.     209999+5 367247+5 158941+2 281708-5-236677+6 946356+2 2500. 6000.1  -0.CL20
229.     1  1  0  0  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  9/65             H
230.     520999+5 134230+5 496799+1 396667-6 110965+1 388627+2  500. 2500.1  -0.H
231.     520999+5 134225+5 496734+1 921 55-6 232451+3 388627+2 2500. 6000.1  -0.H
232.     1  1  1  7  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/65            HN
233.     809999+5 219531+5 665593+1 757250-3-960071+5 609577+2  500. 2500.1  -0.HN
234.     809999+5 217912+5 661 15+1 166 34-3-134750+7 609356+2 2500. 6000.1  -0.HN
235.     1  1  1  7  1  8  0  0  0  0  0  0  0  0JANAF TAPE 7/71  3/63            HNO
236.     237999+5 278548+5 113718+2 669626-3-687643+6 764313+2  500. 2500.1  -0.HNO
237.     237999+5 327906+5 134577+2 665498-4-117566+7 763961+2 2500. 6000.1  -0.HNO
238.     1  1  1  7  2  8  0  0  0  0  0  0  0  0JANAF TAPE 7/71  6/63 TRANS     HNO2   TR
239.     -188399+5 470293+5 165114+2 110 24-2-952 79+6 963405+2  500. 2500.1  -0.HNO2   TR
240.     -189399+5 469226+5 193 31+2 924 45-4-249344+7 963 26+2 2500. 6000.1  -0.HNO2   TR
241.     1  1  1  7  3  8  0  0  0  0  0  0  0  0JANAF TAPE 7/71  6/63            HNO3
242.     -320999+5 610921+5 219620+2 126411-2-152322+7 110915+3  500. 2500.1  -0.HNO3
243.     -320999+5 609614+5 251557+2 987509-4-285753+7 110669+3 2500. 6000.1  -0.HNO3
244.     1  1  2  8  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  3/64            HO2
245.     499999+4 426521+5 111320+2 908514-3-582260+6 800215+2  500. 2500.1  -0.HO2
246.     499999+4 325647+5 134514+2 664851-4-192509+7 799906+2 2500. 6000.1  -0.HO2
247.     2  1  1  7  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/65            H2N
248.     400599+5 307767+5 931217+1 150567-2-475 47+6 702280+2  500. 2500.1  -0.H2N
249.     400599+5 306320+5 131690+2 107546-3-273450+7 701769+2 2500. 6000.1  -0.H2N
250.     2  1  2  7  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/65            H2N2
251.     508999+5 440241+5 144732+2 180804-2-125351+7 851941+2  500. 2500.1  -0.H2N2
252.     508999+5 425392+5 169461+2 1351[illegible]-3-307 74+7 851288+2 2500. 6000.1  -0.H2N2
253.     2  1  2  8  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/60            H2O2
254.     -325299+5 447647+5 130165+2 242 20-2-417391+6 901302+2  500. 1000.1  -0.H2O2
255.     -325299+5 439112+5 140670+2 174477-2-790451+6 897654+2 1000. 1500.1  -0.H2O2
256.     3  1  1  7  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  9/65            H3N
257.     -109699+5 418805+5 126619+2 260909-2-956556+6 769962+2  500. 2500.1  -0.H3N
258.     -109699+5 416927+5 154852+2 939260-3-250 24+7 769297+2 2500. 6000.1  -0.H3N
259.     4  1  2  7  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/65            H4N2
260.     227999+5 689459+5 220594+2 317316-2-187274+7 109246+3  500. 2500.1  -0.H4N2
261.     227999+5 666442+5 302187+2 226174-3-685272+7 108140+3 2500. 6000.1  -0.H4N2
262.     1  7  0  0  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  3/61             N
263.     112964+6 134412+5 492461+1 271364-4 956 39+4 480916+2  500. 2500.1  -0.N
264.     112964+6 134277+5 277722+1 523556-5 567729+7 480468+2 2500. 6000.1  -0.N
265.     1  7  1  0  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  6/63             NO
266.     215799+5 227508+5 505175+1 354495-3-276436+6 666669+2  500. 2500.1  -0.NO
267.     215799+5 227145+5 677301+1 726516-4-192959+6 668541+2 2500. 6000.1  -0.NO
268.     1  7  2  8  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  9/64            NO2
269.     790999+4 345476+5 128604+2 392 47-3-731 99+6 849165+2  500. 2500.1  -0.NO2
270.     790999+4 345   4+5 156887+2 329899-4-455910+6 846 21+2 2500. 6000.1  -0.NO2
271.     2  7  1  8  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/64            N2O
272.     196 99+5 366422+5 133565+2 547758-3-726858+6 816233+2  500. 2500.1  -0.N2O
273.     196 99+5 365783+5 146 28+2 446710-4-652692+6 816  7+2 2500. 6000.1  -0.N2O
274.     2  7  3  8  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/64            N2O3
275.     197999+5 616923+5 230372+2 652593-3-123551+7 123256+3  500. 2500.1  -0.N2O3
276.     197999+5 618123+5 244627+2 562183-4-829998+6 123229+3 2500. 6000.1  -0.N2O3
277.     1  8  0  0  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  6/62             O
278.     595589+5 135166+5 496176+1 567546-5 298680+5 500532+2  500. 2500.1  -0.O
279.     595589+5 135210+5 450112+1 133922-3 904980+6 500947+2 2500. 6000.1  -0.O
280.     2  8  0  0  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 **/61            O2
281.     574   0+0 234441+5 607265+1 503 78-3-238837+6 679715+2  500. 2500.1  -0.O2
282.     574   0+0 234554+5 977777+1 110622-3-476367+7 679755+2 2500  6000.1  -0.O2
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283.    6  1  2  6  0  0  0  0  0  0  0  0  0  0  ODUFF BAUER 6/61                    C2H6
284.  -203200+5  89271D+5  484236+2-169721-2-193480+8  119447+3   500.  3000.1    0.C2H6
285.  -203200+5  89271D+5  393119+2  764877-3-393691+7  119447+3  3000.  5000.1    0.C2H6
286.    3  1  2  6  0  0  0  0  0  0  0  0  0  0  ODUFF BAUER 6/61                    C2H3
287.   659250+5  562430+5  23006E+2  691322-3-499095+7  965150+2   500.  3000.1    0.C2H3
288.   659250+5  562430+5  239033+2  331771-3-335425+7  965150+2  3000.  5000.1    0.C2H3
289.    1  1  3  6  0  0  0  0  0  0  0  0  0  0  ODUFF BAUER 6/61                    C3H
290.  127703+6  489620+5  19446+2  508379-3-311933+7  928820+2   500.  3000.1    0.C3H
291.  127703+6  489620+5  19558+2  245847-3-63251+6  928820+2  3000.  5000.1    0.C3H
292.    2  1  3  6  0  0  0  0  0  0  0  0  0  0  ODUFF BAUER 6/61                    C3H2
293.  106322+6  859170+5  24744+2  992918-3-437586+7  104666+3   500.  3000.1    0.C3H2
294.  106322+6  859170+5  26062+2  364767-3-46773D+7  104666+3  3000.  5000.1    0.C3H2
295.    3  1  3  6  0  0  0  0  0  0  0  0  0  0  ODUFF BAUER 6/61                    C3H3
296.   764856+5  709520+5  23692E+2  766031-3-548098+7  113604+3   500.  3000.1    0.C3H3
297.   764856+5  709520+5  29167E+2  456238-3-138601+7  113604+3  3000.  5000.1    0.C3H3
298.    4  1  3  6  0  0  0  0  0  0  0  0  0  0  ODUFF BAUER 6/61                    C3H4
299.   442440+5  632470+5  372219+2-526861-4-1019944+8  120293+3   500.  3000.1    0.C3H4
300.   442440+5  632470+5  344271+2  578173-3-208515+7  120293+3  3000.  5000.1    0.C3H4
301.    5  1  3  6  0  0  0  0  0  0  0  0  0  0  ODUFF BAUER 6/61                    C3H5
302.   324510+5  546210+5  397325+2  956555-3-904683+7  141759+3   500.  3000.1    0.C3H5
303.   324510+5  546210+5  395073+2  733720-3-949766+6  141759+3  3000.  5000.1    0.C3H5
304.    2  9  0  0  0  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/60            F2
305.  -248  0+0  244390+5  68359E+1  247292-3-194499+6  685728+2   500.  2500.1   -0.F2
306.  -248  0+0  244390+5  89184E+1  211324-3-148286+6  685710+2  2500.  6000.1   -0.F2
307.    1  6  1  1  1 17  2  9  0  0  0  0  0  0JANAF TAPE 7/71  6/70             CHCLF2
308.  -115  994+6  623814+5  22837E+2  102625-2-146595+7  115861+3   500.  2500.1   -0.CHCLF2
309.  -115  994+6  622701+5  25287E+2  801623-4-199187+7  115821+3  2500.  6000.1   -0.CHCLF2
310.    1  6  1  1  2 17  1  9  0  0  0  0  0  0JANAF TAPE 7/71  6/70             CHCL2F
311.  -676999+5  628735+5  22981E+2  973871-3-133876+7  119577+3   500.  2500.1   -0.CHCL2F
312.  -676999+5  627668+5  25318E+2  754636-4-190953+7  119540+3  2500.  6000.1   -0.CHCL2F
313.    1  6  1  1  1  9  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/69          CHF
314.  294999+5  334212+5  10773E+2  127857-2-554 46+6 793  8+2   500.  2500.1   -0.CHF
315.  299999+5  334795+5  16542E+2  135635-4-168133+8 793218+2  2500.  6000.1   -0.CHF
316.    1  6  1  1  1  9  1  3  0  0  0  0  0  0  0JANAF TAPE 7/71  6/61          CHFO
317.  -899999+5  464183+5  16456E+2  117684-2-127806+7  945 56+2   500.  2500.1   -0.CHFO
318.  -899999+5  462892+5  19247E+2  919 19-4-176785+7  944599+2  2500.  6000.1   -0.CHFO
319.    1  6  1  1  3  9  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  6/69          CHF3
320.  -166999+6  612617+5  22413E+2  118 93-2-172348+7  108137+3   500.  2500.1   -0.CHF3
321.  -166999+6  611513+5  25195E+2  930955-4-212412+7  109 91+3  2500.  6000.1   -0.CHF3
322.    1  6  2  1  1 17  1  9  0  0  0  0  0  0JANAF TAPE 7/71  6/70            CH2CLF
323.  -625499+5  590 67+5  205 65+2  160700-2-172722+7  107761+3   500.  2500.1   -0.CH2CLF
324.  -625999+5  588158+5  24892I+2  137830-3-30560I+7  107693+3  2500.  6000.1   -0.CH2CLF
325.    1  6  2  1  2  9  0  0  0  0  1  0  0  0JANAF TAPE 7/71 12/69            CH2F2
326.  -107709+6  582 79+5  20167E+2  193  4-2-192677+7  102324+3   500.  2500.1   -0.CH2F2
327.  -107709+6  580  14+5  24017E+2  149102-3-303753+7  102251+3  2500.  6000.1   -0.CH2F2
328.    1  6  3  1  1  9  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/63          CH3F
329.  -559999+5  556 15+5  161 48+2  261954-2-199 81+7  936679+2   500.  2500.1   -0.CH3F
330.  -559999+5  553257+5  24479I+2  198512-3-400196+7  935705+2  2500.  6000.1   -0.CH3F
331.    2  6  2  9  0  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/67          C2F2
332.  499999+4  524547+5  19559E+2  458563-3-952266+6  100401+3   500.  2500.1   -0.C2F2
333.  499999+4  523982+5  20620+2  391 44-4-649564+6  100381+3  2500.  6000.1   -0.C2F2
334.    2  6  3  9  1  7  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71 12/69          C2F3N
335.  -118399+6  790225+5  296 19+2  794111-3-165851+7  134 42+3   500.  2500.1   -0.C2F3N
336.  -118399+6  788268+5  31552I+2  655874-4-137200+7  134  9+3  2500.  6000.1   -0.C2F3N
337.    2  6  4  9  0  0  0  0  0  0  0  0  0  0  0JANAF TAPE 7/71  6/69          C2F4
338.  -157999+6  794274+5  299  1+2  688468-3-165373+7  134694+3   500.  2500.1   -0.C2F4
339.  -157999+6  793422+5  31392E+2  597540-4-115975+7  134864+3  2500.  6000.1   -0.C2F4
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340.    2  6  1   1  1  9   0  0  0   0  0  0  0  0JANAF TAPE 7/71 12/67          C2HF
341.   29999+5 49A193+5 172540+2 119818-2-82736+6 946956+2  500. 2500.1  -0.C2HF
342.   29999+5 496997+5 202593+2 881 54-4-226543+7 946533+2 2500. 6000.1  -0.C2HF
343.    1 17  1   9  0  0   0  0  0   0  0  0  0  0JANAF TAPE 7/71  9/65          CLF
344.  -12139+5 241277+5 688159+1 128272-3-15681A+6 721336+2  500. 2500.1  -0.CLF
345.  -12139+5 241247+5 892831+1 107617-3-126 41+6 721325+2 2500. 6000.1  -0.CLF
346.    1 17  1   9  3  8   0  0  0   0  0  0  0  0JANAF TAPE 7/71  3/61          CLFO3
347.  -51199+4 651919+5 248877+2 349  7-3-131754+7 118738+3  500. 2500.1  -0.CLFO3
348.  -51199+4 651473+5 256228+2 314790-4-950455+6 118723+3 2500. 6000.1  -0.CLFO3
349.    1 17  3   9  0  0   0  0  0   0  0  0  0  0JANAF TAPE 7/71  9/65          CLF3
350.  -37969+5 521236+5 197523+2 450444-4-501947+6 110408+3  500. 2500.1  -0.CLF3
351.  -37969+5 521176+5 198439+2 425666-5-437256+6 110406+3 2500. 6000.1  -0.CLF3
352.    1  9  0   0  0  0   0  0  0   0  0  0  0  0JANAF TAPE 7/71  9/65          F
353.   18859+5 136789+5 503772+1-250 79-4 675898+5 497896+2  500. 2500.1  -0.F
354.   18859+5 136820+5 498358+1-2298A1-5 511 68+5 497907+2 2500. 6000.1  -0.F
355.    1  9  1   1  1  8   0  0  0   0  0  0  0  0JANAF TAPE 7/71  9/65          FHO
356.  -30999+5 324127+5 109339+2 955969-3-55053+6 794 60+2  500. 2500.1  -0.FHO
357.  -30999+5 323249+5 134245+2 698725-4-227199+7 793749+2 2500. 6000.1  -0.FHO
358.    1  9  1   7  0  0   0  0  0   0  0  0  0  0JANAF TAPE 7/71  6/65          FN
359.   59499+5 237720+5 874469+1 178 15-3-241277+6 709764+2  500. 2500.1  -0.FN
360.   59499+5 237626+5 889689+1 1117A0-3-157572+6 709731+2 2500. 6000.1  -0.FN
361.    1  9  1   7  1  8   0  0  0   0  0  0  0  0JANAF TAPE 7/71  6/61          FNO
362.  -15699+5 352329+5 130324+2 315542-3-527139+6 878299+2  500. 2500.1  -0.FNO
363.  -15699+5 351949+5 137315+2 266136-4-382215+6 878165+2 2500. 6000.1  -0.FNO
364.    1  9  1   7  2  8   0  0  0   0  0  0  0  0JANAF TAPE 7/71 12/65          FNO2
365.  -25999+5 49552+5 186360+2 448868-3-104727+7 101561+3  500. 2500.1  -0.FNO2
366.  -25999+5 49496+5 196111+2 388625-4-734965+6 101541+3 2500. 6000.1  -0.FNO2
367.    1  9  1   7  3  8   0  0  0   0  0  0  0  0JANAF TAPE 7/71  3/63          FNO3
368.   24999+4 648 46+5 245495+2 469189-3-133841+7 121641+3  500. 2500.1  -0.FNO3
369.   24999+4 64745+5 255565+2 413666-4-947439+6 121621+3 2500. 6000.1  -0.FNO3
370.    1  9  1   8  0  0   0  0  0   0  0  0  0  0JANAF TAPE 7/71 12/66          FO
371.   25999+5 240260+5 876818+1 213141-3-226  5+6 715186+2  500. 2500.1  -0.FO
372.   25999+5 240140+5 867377+1 200690-3 558627+6 715144+2 2500. 6000.1  -0.FO
373.    1  9  2   9  0  0   0  0  0   0  0  0  0  0JANAF TAPE 7/71  9/66          FO2
374.   29999+4 358727+5 134 79+2 183316-3-438715+6 913264+2  500. 2500.1  -0.FO2
375.   29999+4 358498+5 138 13+2 162242-4-28682A+6 913183+2 2500. 6000.1  -0.FO2
376.    2  9  1   7  0  0   0  0  0   0  0  0  0  0JANAF TAPE 7/71  3/64          F2N
377.   10099+5 358 73+5 136 35+2 114 92-3-529 83+6 868773+2  500. 2500.1  -0.F2N
378.   10099+5 357925+5 138395+2 106264-4-387321+6 868720+2 2500. 6000.1  -0.F2N
379.    2  9  2   7  0  0   0  0  0   0  0  0  0  0JANAF TAPE 7/71 12/65          F2N2  TR
380.   19399+5 501991+5 189566+2 334461-3-930923+6 103 57+3  500. 2500.1  -0.F2N2  TR
381.   19399+5 501573+5 196753+2 293767-4-655596+6 103 42+3 2500. 6000.1  -0.F2N2  TR
382.    2  9  1   8  0  0   0  0  0   0  0  0  0  0JANAF TAPE 7/71 12/69          F2O
383.   58599+4 361675+5 137175+2 718  7-4-434922+6 888332+2  500. 2500.1  -0.F2O
384.   58599+4 361581+5 138658+2 659889-5-342524+6 888299+2 2500. 6000.1  -0.F2O
385.    3  9  1   7  0  0   0  0  0   0  0  0  0  0JANAF TAPE 7/71  6/69          F3N
386.  -31429+5 508316+5 194630+2 152192-3-872260+6 103348+3  500. 2500.1  -0.F3N
387.  -31429+5 508117+5 197771+2 140586-4-676939+6 103341+3 2500. 6000.1  -0.F3N
388.    3  9  1   7  1  8   0  0  0   0  0  0  0  0JANAF TAPE 7/71  6/70          F3NO
389.  -38999+5 655385+5 248870+2 345108-3-117800+7 119228+3  500. 2500.1  -0.F3NO
390.  -38999+5 654954+5 256290+2 303997-4-898 75+6 119212+3 2500. 6000.1  -0.F3NO
391.    1 13  1  17  1  9   0  0  0   0  0  0  0  0JANAF TAPE 7/71  9/64          ALCLF
392.  -11999+6 367721+5 138415+2 259154-4-259155+6 990862+2  500. 2500.1  -0.ALCLF
393.  -11999+6 367687+5 138947+2 239  5-5-224  9+6 990850+2 2500. 6000.1  -0.ALCLF
394.    1 13  1  17  2  9.  0  0  0   0  0  0  0  0JANAF TAPE 7/71  9/64          ALCLF2
395.  -23759+6 521248+5 196956+2 659232-4-489250+6 114429+3  500. 2500.1  -0.ALCLF2
396.  -23759+6 521162+5 198306+2 627195-5-400930+6 114426+3 2500. 6000.1  -0.ALCLF2
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397.    1 13  2 17  1  9  0  0  0   0  0  0  0 0JANAF TAPE 7/71  9/64        ALCL2F
398.  -18859+6 52477+5 19763+2 40A103-4-385568+6 118120+3  500. 2500.1  -0.ALCL2F
399.  -18859+6 52471?+5 19847+2 366848-5-333708+6 118118+3 2500. 6000.1  -0.ALCL2F
400.    1 13  1  9  0  0  0  0  0   0  0  0  0 0JANAF TAPE 7/71  6/69        ALF
401.  -63399+5 24041?+5 88747+1 116104-3-16192?+6 713971+2  500. 2500.1  -0.ALF
402.  -63399+5 24037?+5 88956?+1 989896-4-25324A+5 713957+2 2500. 6000.1  -0.ALF
403.    1 13  1  9  1  8  0  0  0   0  0  0  0 0JANAF TAPE 7/71  3/64        ALF0
404.  -14019+6 387 28+5 14730+2 647977-4-49023?+6 A77 21+2  500. 2500.1  -0.ALF0
405.  -1401?+6 38694?+5 14862?+2 620618-5-39995?+6 876941+2 2500. 6000.1  -0.ALF0
406.    1 13  2  9  0  0  0  0  0   0  0  0  0 0JANAF TAPE 7/71  9/64        ALF2
407.  -16499+6 36410+5 13752?+2 589260-4-361521+6 935 50+2  500. 2500.1  -0.ALF2
408.  -16499+6 364 26+5 13873?+2 557732-5-279841+6 935 23+2 2500. 6000.1  -0.ALF2
409.    1 13  3  9  0  0  0  0  0   0  0  0  0 0JANAF TAPE 7/71  6/70        ALF3
410.  -289 34+6 51759?+5 19613+2 961594-4-59317+6 10A750+3  500. 2500.1  -0.ALF3
411.  -289 34+6 51746A+5 19811?+2 889909-5-47048A+6 108746+3 2500. 6000.1  -0.ALF3
412.    2 13  6  9  0  0  0  0  0   0  0  0  0 0JANAF TAPE 7/71  6/70        AL2F6
413.  -62944?+6 11374?+6 43216?+2 186920-3-13633?+7 185892+3  500. 2500.1  -0.AL2F6
414.  -62944?+6 11371?+6 43599?+2 176772-4-11139?+7 1858A3+3 2500. 6000.1  -0.AL2F6
415.    1  6  1 17  1  9  1  A  0   0  0  0  0 0JANAF TAPE 7/71  6/61        CCLF0
416.  -10199+6 49931?+5 18740?+2 408800-3-93952?+6 106163+3  500. 2500.1  -0.CCLF0
417.  -10199+6 49A81?+5 19639?+2 346428-4-709 93+6 106145+3 2500. 6000.1  -0.CCLF0
418.    1  6  1 17  3  9  0  0  0   0  0  0  0 0JANAF TAPE 7/71  6/69        CCLF3
419.  -16919+6 65473?+5 250 18+2 307306-3-12557?+7 120684+3  500. 2500.1  -0.CCLF3
420.  -16919+6 65434?+5 25645?+2 279824-4-91339?+6 120670+3 2500. 6000.1  -0.CCLF3
421.    1  6  2 17  2  9  0  0  0   0  0  0  0 0JANAF TAPE 7/71  6/70        CCL2F2
422.  -11749+6 66259+5 25248?+2 216872-3-10540?+7 125637+3  500. 2500.1  -0.CCL2F2
423.  -11749+6 66231?+5 25699A+2 198840-4-79957?+6 125628+3 2500. 6000.1  -0.CCL2F2
424.    1  6  3 17  1  9  0  0  0   0  0  0  0 0JANAF TAPE 7/71  6/70        CCL3F
425.  -68999+5 67014?+5 25461?+2 13A280-3-85223+6 12891+3  500. 2500.1  -0.CCL3F
426.  -68999+5 66996?+5 25747+2 127695-4-67941?+6 126908+3 2500. 6000.1  -0.CCL3F
427.    1  6  1  9  0  0  0  0  0   0  0  0  0 0JANAF TAPE 7/71  6/70        CF
428.   6099?9+5 23487?+5 86071?+1 208914-3-26692?+6 701371+2  500. 2500.1  -0.CF
429.   6099?9+5 23465?+5 84381?+1 187354-3 112597+7 701296+2 2500. 6000.1  -0.CF
430.    1  6  1  9  1  7  0  0  0   0  0  0  0 0JANAF TAPE 7/71  6/69        CFN
431.   859999+4 37082?+5 13443A+2 512591-3-58891?+6 836489+2  500. 2500.1  -0.CFN
432.   859999+4 37023A+5 14627?+2 409  1-4-6141?6+6 836282+2 2500. 6000.1  -0.CFN
433.    1  6  1  9  1  8  0  0  0   0  0  0  0 0JANAF TAPE 7/71 12/65        CF0
434.  -40999+5 34858?+5 12914?+2 358914-3-62451?+6 873417+2  500. 2500.1  -0.CF0
435.  -40999+5 34814?+5 137 35+2 304924-4-43746?+6 873265+2 2500. 6000.1  -0.CF0
436.    1  6  2  9  0  0  0  0  0   0  0  0  0 0JANAF TAPE 7/71  6/70        CF2
437.  -43499+5 35397A+5 13369?+2 212496-3-61877?+6 860687+2  500. 2500.1  -0.CF2
438.  -43499+5 354 19+5 117 83+2 640 47-3 30859?+7 860701+2 2500. 6000.1  -0.CF2
439.    1  6  2  9  1  A  0  0  0   0  0  0  0 0JANAF TAPE 7/71 12/69        CF20
440.  -15269+6 49141?+5 18461?+2 509491-3-11276?+7 100635+3  500. 2500.1  -0.CF20
441.  -15269+6 490790+5 19578?+2 435480-4-82686?+6 100613+3 2500. 6000.1  -0.CF20
442.    1  6  3  9  0  0  0  0  0   0  0  0  0 0JANAF TAPE 7/71  6/69        CF3
443.  -11239+6 49935?+5 19039?+2 307225-3-106 A9+7 103108+3  500. 2500.1  -0.CF3
444.  -11239+6 49495?+5 19686?+2 276268-4-73596?+6 103 95+3 2500. 6000.1  -0.CF3
445.    1  6  4  9  0  0  0  0  0   0  0  0  0 0JANAF TAPE 7/71  6/69        CF4
446.  -223 39+6 64612+5 24719?+2 413699-3-14684?+7 113647+3  500. 2500.1  -0.CF4
447.  -223 39+6 64559?+5 25583?+2 372280-4-10382?+7 113628+3 2500. 6000.1  -0.CF4
448.    2  6  0  0  0  0  0  0  0   0  0  0  0 0JANAF TAPE 7/71 12/69        C2
449.   20022?+6 24725?+5 76672?+1 759223-3 18766+6 685755+2  500. 2500.1  -0.C2
450.   20022?+6 24686?+5 84361?+1 447170-3 24236?+6 685615+2 2500. 6000.1  -0.C2
451.    3  6  0  0  0  0  0  0  0   0  0  0  0 0JANAF TAPE 7/71 12/69        C3
452.   19599?+6 31053?+5 10222?+2 100665-2-44591?+6 812712+2  500. 2500.1  -0.C3
453.   19599?+6 30986?+5 12524?+2 230548-3-27024?+7 812476+2 2500. 6000.1  -0.C3
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454.      4  6  0  0  0  0  0  0  0  0  0  0  0 0JANAF TAPE 7/71 12/69          C4
455.     231999+6 512125+5 188896+2 704455-3-112388+7 949357+2  500. 2500.1  -0.C4
456.     231999+6 511290+5 204734+2 580770-4-92316 3+6 949 62+2 2500. 6000.1  -0.C4
457.      5  6  0  0  0  0  0  0  0  0  0  0  0 0JANAF TAPE 7/71 12/69          C5
458.     233999+6 654912+5 241752+2 944161-3-152366+7 109184+3  500. 2500.1  -0.C5
459.     233999+6 653796+5 263 12+2 779183-4-127644+7 109145+3 2500. 6000.1  -0.C5
460.      2 13  3  8  0  0  0  0  0  0  0  0  0 0JANAF TAPE 7/71  3/64 ALPHA   AL203  *
461.    -400399+6 843519+5 287731+2 223942-2-116653+7 786282+2  500. 2316.2  -0.AL203  *
462.    -373355+6 856587+5 346222+2 160187-6 20479 +4 908747+2 2316. 3500.3  -0.AL203  *
463.
464.    689068.   101676.95 .433
465.    13177900. 101676.95 .433
466.    44160.3   117282.75
467.      .125                -.5
468.      .261                -.5
469.      .012                -.5
470.      .130                -.5
471.      .00096              -.5
472.    252.67    5418.31   .054      .0001
473.
474.    252.67    5418.31   .054      .0001
475.
476.    53.681    18.786    .059
477.
478.    8
```

Sample Problem 3 Output

```
        GRAPHITE SURFACE KINETICS (GASKET) PROB. 3          0130000+00

RELATIVE ELEMENTAL COMPOSITIONS, ATOMIC WTS/UNIT MASS
     AT.NO.    ELEMENT      ATOMIC WT      EDGE GAS       SURFACE
        1      HYDROGEN       1.00800      .0367311      .0000000
        6      CARBON        12.01100      .0166646      .0000000
        7      NITROGEN      14.00700      .0124297      .0000000
        8      OXYGEN        16.00000      .0363751      .0000000
        9      FLUORINE      19.00000      .0002268      .0000000
      106      GRAPHITE      12.01100      .0000000      .0632570

    ELEMENTS          HYDROGEN     CARBON       NITROGEN     OXYGEN       FLUORINE
                      GRAPHITE

    BASE SPECIES      H2           CO2          N2           H2O          FH
                      C*
 UPDATE OF DIFFUSION FACTORS
          SPECIES      DIFFUSION FACTOR
           CO2               1.29140
           H2                 .38930
           H2O                .77490
           N2                1.02620
           CO                1.01700
           C                  .69180
           CH                 .74920
           CH4                .93570
           CN                1.02670
           C2H2              1.17460
           H                  .30180
           N                  .74930
           NO                 .99810
           O                  .73970
           O2                1.00000
           C2                1.02530
```

Sample Problem 3 Output (Continued)

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      GRAPHITE SURFACE KINETICS (BARNETT PROB. 5        5002800+00

                                                                    6  6

   CP-FROZEN=   .40642+00

PROPERTY ROUTINE OUTPUT IN  LB-MASS,FT,SEC,BTU,ATM,DEG-R
   TEMP          VISC          COND          DBAR          FR            SC
 .28200+04     .32282-04     .21946-04     .23999-03     .59490+00     .72560+00
   RHO1          RHO2          MOL.WT        HTIL          CPTIL         PTIL
 .91040+00     .24522+02     .24822+02    -.22382+04     .48510+00    -.22777+04

ELEMENTAL W AND Z MASS FRACTIONS BY ATOMIC NUMBER . . . . (BARER =  .667)
     1             6             7             8             9            10A
  .84787-01     .20289+00     .16974+00     .58062+00     .42026-02     .00000
  .69837-01     .18074+00     .16929+00     .58775+00     .46036-02     .00000

SOLUTION TIMES
        ITERATIONS =    9                          TIME =    2.056A SEC.

OPEN SYSTEM CHEMICAL KINETICS SOLUTION OUTPUT

 SURFACE IS PC 901
 MASS TRANSFER COEFFICIENT RHOCM =    .24600+00
 RHO V WALL/RHOE UE CM =    .36569-09   BPRIME =    .36589-05

 STATE ADJACENT TO THE SURFACE . . . .
  TEMP =  2820.0000 DEG R =  1400.0000 DEG K      PRESS =     12.77800 ATM

                                GAS           CONDENSED       COMPOSITE
  ENTHALPY - BTU/LBM          -.23210+04        .00000         -.23210+04
  ENTROPY - BTU/LBM DEG R      .22778+01        .00000          .00000
  DENSITY - LBM/FT3            .17238+00                        .17238+00
  MOLECULAR WEIGHT            24.8277           .0000         24.8277


 NET FORWARD RATE OF KINETICALLY CONTROLLED REACTIONS
  (MOLES OF REACTION / UNIT SURFACE AREA / TIME / RHOE UE CM). . . .
  1=   .20622-11  2=   .20399-10  3=   .62277-15  4=   .15180-18  5=   .52297-21
  6=   .12446-20  7=   .11020-25  8=   .10993-27

RATIO OF FORWARD TO REVERSE KINETICALLY CONTROLLED PRODUCTION RATES
 1=   .20448+03  2=   .20448+03  3=   .41813+05  4=   .20448+03  5=   .41813+05
 6=   .39606+07  7=   .34961+02  8=   .33290+00

 CHEMICAL STATE ADJACENT TO THE SURFACE
  (MOLE FR FOR GASES = MOLECULES / TOTAL GAS MOLECULES )
  (MOLE FR FOR CONDENSED = BPRIME CONDENSED ). . . .

   SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.
   CO2       .20660+00     H2        .13763+00     H2O       .28701+00     C+        .00000      FH        .54917-02
   N2        .15046+00     CO        .21270+00     C         .12225-21     HO        .20168-07     NO3       .27889-29
   CH        .29689-19     CHN       .36508-06     CHNO      .62813-07     CHO       .31555-08     CH2       .34622-15
   CH2O      .32602-06     CH3       .43417-09     CH4       .69669-05     CN        .60689-14     CNO       .19368-13
   CN2  NCN  .82829-19     C2H       .23449-16     C2H2      .96292-11     C2H4      .12399-10     C2H4O     .58602-17
   C2N       .26030-19     C2N2      .18655-14     C2O       .82804-16     C3O2      .26190-13     C4N       .62098-28
   C4N2      .91220-22     C4N2      .20810-25     H         .58230-06     HN        .36068-12     HNO       .90945-13
   HNO2  TR  .60216-16     HNO3      .20548-24     HO2       .51714-16     H2N       .11257-08     H2N2      .38256-14
   H2O2      .36376-13     H3N       .21726-04     H4N2      .18715-15     N         .92360-15     NO        .19767-09
   NO2       .28866-17     N2O       .17162-13     N2O3      .19449-31     O         .68869-13     O2        .60927-13
   C2H6      .96498-12     C2H3      .73869-15     C3H       .62367-20     C3H2      .11281-19     C3H3      .85098-18
   C3H4      .17998-16     C3H5      .26672-15     F2        .29367-24     CHF       .50361-17     CHFO      .19526-08
   CHF3      .13191-18     CH2F2     .49591-15     CH3F      .83196-11     C2F2      .60764-28     C2F3H     .99379-28
   C2F4      .95265-34     C2HF      .65967-19     F         .26389-12     FHO       .35534-16     FN        .10407-20
   FNO       .18522-18     FNO2      .74188-98     FNO3      .00000        FO        .60793-22     FO2       .16685-27
   F2N       .28879-28     F2N2  TR  .76866-36     F2O       .32145-44     F3N       .34429-38     F3NO      .00000
   CF        .77779-19     CFN       .79870-15     CFO       .14915-12     CF2       .33902-18     CF2O      .12083-11
   CF3       .34321-23     CF4       .41522-28     C2        .13842-26     C3        .43170-27     CN        .19864-35
   C5        .14009-37
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Sample Problem 3 Output (Continued)

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                GRAPHITE SURFACE KINETICS (GASKET) SOLUTION        PROB. 3


DERIVATIVE PROPERTY OUTPUT
 CP-FROZEN     CP-EQUIL    DLNM/DLNT    DLNM/DLNP      GAMMA
  .46249+00    .65564+00   -.99470-01    .44135-02    .11752+01

PROPERTY ROUTINE OUTPUT IN  LB-MASS,FT,SEC,BTU,AND DEG-R
   TEMP          VISC          COND          DBAR          PR            SC
  .50505+04    .51724-04     .39360-04     .76050-03    .60777+00     .72573+00
   MU1           MU2          MOL.WT         HTIL         CPTIL         HTIL*
  .90353+00    .24443+02     .23866+02    -.78863+03    .54365+00    -.90189+03

ELEMENTAL K AND Z MASS FRACTIONS BY ATOMIC NUMBER . . . . (GAMEX =  .667)
     1             6             7             8             9            106
   .37025-01    .20256+00     .17410+00     .38200+00     .43097-02     .00000
   .49537-01    .18874+00     .16929+00     .38775+00     .46886-02     .00000

SOLUTION TIMES
        ITERATIONS =   38                          TIME =   15.499 SEC.

CLOSED SYSTEM EQUILIBRIUM SOLUTION OUTPUT

  MASS CONDENSED/MASS GAS =     .00000
  TEMP =  5050.4579 DEG R.  =  2805.8100 DEG K.      PRESS =     12.77800 ATM

                                  GAS              CONDENSED        COMPOSITE
  ENTHALPY - BTU/LBM           -.10389+04          .00000          -.10389+04
  ENTROPY - BTU/LBM DEG R       .26582+01          .00000           .26582+01
  DENSITY - LBM/FT3             .82678-01                           .82678-01
  MOLECULAR WEIGHT             23.8660             .0000          23.8660

 CHEMICAL STATE  (MOLE FR. = MOLECULES / TOTAL GAS PHASE MOLECULES).....

   SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.
   CO2       .12957+00     H2        .10109+00     H2O       .32744+00     C*        .00000        FH        .54117-02
   N2        .14795+00     CO        .27292+00     C         .77738-11     HO        .67376-02     NO3       .39440-13
   CH        .61978-11     CH*       .22775-06     CHO       .11418-06     CHO       .24662-05     CH2       .83245-11
   CH2O      .20108-06     CH3       .23200-09     CH4       .13789-09     CN        .17571-04     CNO       .39465-08
   CN2  NCN  .18493-12     C2H       .81523-13     C2H2      .69146-12     C2H4      .22785-15     C2H4O     .10718-16
   C2N       .48730-14     C2N2      .88705-14     C2O       .99466-11     C3O2      .55113-13     C4H       .29314-23
   C4N2      .72782-24     C4N2      .17314-25     H         .75962-02     HN        .66533J-06    HNO       .38493-06
   HNO2  TR  .11660-07     HNO3      .64432-12     HO2       .53589-06     H2N       .84655-06     H2N2      .22739-10
   H2O2      .30976-06     H3F       .12701-05     HNO2      .48335-14     N         .39010-06     NO        .74492-03
   NO2       .70996-07     N2O       .5822R-07     N2O3      .37731-15     O         .31581-03     O2        .41419-03
   C2H6      .21207-19     C2H3      .25796-15     C3H       .62186-18     C3H2      .29627-19     C3H3      .58943-20
   C3H4      .27923-21     C3H5      .48281-21     F2        .91304-14     CHF       .28473-12     CHFO      .28847-08
   CHF3      .12704-18     CH2F2     .72542-16     CH3F      .54603-13     C2F2      .33838-22     C2F3N     .28234-26
   C2F4      .39976-30     C2HF      .13616-16     F         .17095-05     FHO       .11542-08     FN        .87972-11
   FNO       .870A5-10     FNO2      .94923-15     FNO3      .20093-21     FO        .92544-10     FO2       .32441-12
   F2N       .57401-17     F2N2  TR  .11121-21     F2O       .23176-18     F3N       .95160-25     F3NO      .17392-29
   CF        .167A1-11     CFN       .17162-11     CF2       .2465R-08     CF2       .81495-14     CF2O      .75542-11
   CF3       .72827-19     CF4       .42956-22     C2        .3483E-16     C3        .55451-20     C4        .88885-28
   C5        .24395-32
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Sample Problem 3 Output (Continued)

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        GRAPHITE SURFACE KINETICS (GASKET) PROB. 3          0000000+00

DERIVATIVE PROPERTY OUTPUT
 CP-FROZEN     CP-EQUIL    DLNM/DLNT    DLNM/DLNP      GAMMA
  .38462+00    .19183+01   -.27575+00    .44135-02    .10709+01

PROPERTY ROUTINE OUTPUT IN  LB-MASS,FT,SEC,BTU,AND DEG-R
   TEMP          VISC          COND          CBAR          PR            SC
  .18000+04    .26207-04     .16470-04     .15733-05    .61201+00     .72573+00
   MU1           MU2          MOL.WT         HTIL          CPTIL         HTIL*
  .90353+00    .24443+02     .23866+02    -.24210+04    .44749+00    -.24385+04

ELEMENTAL K AND Z MASS FRACTIONS BY ATOMIC NUMBER . . . . (GAMEX =  .667)
      1             6             7             8             9           106
   .37025-01     .20256+00     .17410+00     .58200+00     .43097-02     .00000
   .49537-01     .18874+00     .16929+00     .58775+00     .46836-02     .00000

SOLUTION TIMES
        ITERATIONS =   38                          TIME =      .232 SEC.

CLOSED SYSTEM EQUILIBRIUM SOLUTION OUTPUT

  MASS CONDENSED/MASS GAS =     .00000
  TEMP =  1800.0000 DEG R.  =  1000.0000 DEG K.      PRESS =     12.77400 ATM

                                  GAS              CONDENSED        COMPOSITE
  ENTHALPY - BTU/LBM           -.24353+04           .00000          -.24353+04
  ENTROPY - BTU/LBM DEG R       .22222+01           .00000           .22222+01
  DENSITY - LBM/FT3             .23198+00                            .23198+00
  MOLECULAR WEIGHT             23.8660              .0000           23.8660

 CHEMICAL STATE  (MOLE FR. = MOLECULES / TOTAL GAS PHASE MOLECULES).....

    SPECIES    MOLE FR.       SPECIES    MOLE FR.       SPECIES    MOLE FR.       SPECIES    MOLE FR.       SPECIES    MOLE FR.
    CO2        .12957+00      H2         .10109+00      H2O        .42744+00      C*         .00000         FH         .54117-02
    N2         .14795+00      CO         .27292+00      C          .77738-11      HO         .67376-02      NO3        .39480-13
    CH         .61978-11      CHN        .22775-06      CHO        .11414-06      CHO        .24462-05      CH2        .85245-11
    CH2O       .20108-06      CH3        .23200-09      CH4        .13784-09      CN         .17571-08      CHO        .39465-08
    CN2  NCN   .18493-12      C2H        .81523-13      C2H2       .65146-12      C2H4       .22785-15      C2H4O      .10719-18
    C2N        .48730-14      C2N2       .68703-14      C2O        .94466-11      C3O2       .53113-13      C4H        .29319-23
    C4H2       .72782-24      C4N2       .17314-25      H          .73462-02      HN         .46530-06      HNO        .38493-06
    HNO2  TR   .11660-07      HNO3       .24432-12      HO2        .55589-06      H2N        .84655-06      H2N2       .22759-10
    H2O2       .30976-06      H3N        .12701-05      H4O2       .69335-14      N          .39010-06      NO         .74492-03
    NO2        .70996-07      N2O        .58228-07      N2O3       .37731-15      O          .31581-03      O2         .41419-03
    C2H6       .21207-19      C2H3       .25746-15      C3H        .62106-14      C3H2       .29427-19      C3H3       .58943-20
    C3H4       .27923-21      C3H5       .48281-21      F2         .41304-14      CHF        .28675-12      CHFO       .28847-08
    CHF3       .12704-18      CH2F2      .72542-16      CH3F       .54601-13      CF2        .35634-22      C2F3N      .24234-26
    C2F4       .39976-30      C2HF       .13516-16      F          .17095-05      FHO        .11542-08      FN         .87972-11
    FNO        .87085-10      FNO2       .94423-15      FNO3       .20093-21      FO         .92544-10      FO2        .32441-12
    F2N        .57401-17      F2N2  TR   .11121-21      F2O        .23175-18      F3N        .95160-25      F3NO       .17392-29
    CF         .16781-11      CFN        .17162-11      CFO        .24457-08      CF2        .41495-14      CF2O       .75542-11
    CF3        .72827-19      CF4        .42456-22      C2         .34936-14      C3         .55451-20      C4         .88885-28
    C5         .24395-32
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Sample Problem 3 Output (Concluded)

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        CP-FROZEN=   .4930E+00

PROPERTY ROUTINE OUTPUT IN  LB-MASS,FT,SEC,DEGREES DEG-R
   TEMP          VISC          COND          DMAF          PR          SC
 .21600+04    .2098E-04    .1940E-04    .1658E-03    .5F705+00    .7256E+00
   MU1           MU2          MOL.WT        FTIL          CPTIL        HTIL*
 .92343+00    .24500+02    .2516E+02   -.2412E+04    .47775+00   -.2459E+04

ELEMENTAL K AND Z MASS FRACTIONS BY ATOMIC NUMBER . . . . (GAMEX =  .667)
     1             6             7             8             9            106
  .33689-01    .20301+00    .16801+00    .5911E+00    .415A7-06    .00000
  .49537-01    .1847E+00    .1692E+00    .5A775+00    .46E36-06    .00000

SOLUTION TIMES
        ITERATIONS =    9                          TIME =    2.474 SEC.

OPEN SYSTEM CHEMICAL KINETICS SOLUTION OUTPUT

 SURFACE IS PC 901
 MASS TRANSFER COEFFICIENT RHOCM =    .2460E+00
 RHO V WALL/RHOE UE CM =    .7485E-12   EPRIME =    .7485E-12

 STATE ADJACENT TO THE SURFACE . . . .
  TEMP =  2160.0000 DEG R =  1200.0000 DEG K     PRESS =     12.7700 ATM

                                GAS            CONDENSED       COMPOSITE
  ENTHALPY - BTU/LBM          -.2505E+04        .0000          -.2505E+04
  ENTROPY - BTU/LBM DEG R      .2183E+01        .0000           .0000
  DENSITY - LBM/FT3            .2040E+00                        .2040E+00
  MOLECULAR WEIGHT           25.1859             .0000         25.1859


 NET FORWARD RATE OF KINETICALLY CONTROLLED REACTIONS
  (MOLES OF REACTION / UNIT SURFACE AREA / TIME / RHOE UE CM). . . .
  1=   .3414E-14  2=   .5893E-13  3=   .6283E-18  4=   .5508E-23  5=   .3492E-26
  6=   .1293E-25  7=   .1147E-31  8=   .9612E-34

RATIO OF FORWARD TO REVERSE KINETICALLY CONTROLLED PRODUCTION RATES
  1=   .2814E+02  2=   .2814E+02  3=   .7919E+03  4=   .2814E+02  5=   .1125E+02
  6=   .4163E+02  7=   .3692E-04  8=   .3093E-06

 CHEMICAL STATE ADJACENT TO THE SURFACE
  (MOLE FR FOR GASES = MOLECULES / TOTAL GAS MOLECULES )
  (MOLE FR FOR CONDENSED = BRUTE CONDENSED ). . . .

   SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.      SPECIES   MOLE FR.
   CO2       .2395E+00     H2        .1522E+00     H2O       .2654E+00     C*        .0000       FH        .5512E-02
   N2        .1510E+00     CO        .1860E+00     C         .3078E-25     HO        .2481E-09     NO3       .1204E-34
   CH        .3904E-22     CHN       .3948E-06     CHO       .5119E-07     CHO       .3311E-09     CH2       .1201E-16
   CH2O      .3756E-06     CH2       .5220E-09     CH4       .1623E-03     CN        .9015E-16     CNO       .3341E-15
   CN2  NCN  .6565E-21     C2H       .1499E-17     C2H2      .2320E-10     C2H4      .4711E-09     C2H4O     .2339E-16
   C2N       .4594E-21     C2H2      .1152E-14     C2O       .1694E-17     C3O2      .2089E-13     C4H       .1705E-25
   C4H2      .1604E-21     CH+2      .3559E-25     H-        .2144E-07     4N        .2469E-14     HNC       .5637E-15
   HNO2  TR  .1092E-18     HNO3      .1907E-28     HO2       .2369E-19     H2N       .1226E-09     H3N2      .2108E-15
   H2O2      .1410E-15     H3N       .5608E-04     H2N2      .6347E-16     N         .4547E-14     NO        .1276E-11
   NO2       .1012E-20     N2O       .1205E-15     N2O3      .5347E-47     O         .4301E-16     O2        .3834E-16
   C2H6      .3959E-09     C2H3      .1032E-14     C3H       .1512E-26     C3H2      .8502E-20     C3H3      .4477E-17
   C3H4      .7606E-15     C3H5      .2364E-13     F2        .1001E-27     CHF       .1201E-18     CHFO      .1172E-08
   CHF3      .1480E-18     CH2F2     .1005E-14     C4H2F     .4583E-10     C2F2      .7928E-30     C2F3N     .3728E-28
   C2F4      .6994E-35     C2HF      .1143E-14     F         .1443E-14     FNO       .1129E-18     FN        .5359E-24
   FNO       .1171E-21     FNO2      .3457E-12     FNO3      .0000         FO        .5527E-26     FO2       .1409E-32
   F2N       .5552E-32     F2N2  TR  .7761E-28     F2O       .0000         FNI       .0000         F3NO      .0000
   CF        .2788E-21     CFN       .6387E-16     CFO       .5804E-14     CF2       .1201E-18     CF2O      .6919E-12
   CF3       .1355E-24     CF4       .2222E-25     C2        .4545E-40     C3        .1549E-29     C4        .5336E-38
   C5        .0000
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